NP6012/NP6012F /NP6212

SERVICE MANUAL

REVISION 1

Canon

SEPT. 1995

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INTRODUCTION

This Service Manual contains the basic facts and figures about the plain paper copier NP6012, NP6012F, NP6212, and is compiled to serve as a handy reference for servicing the machine in the field.

This Service Manual consists of the following chapters:

In CHAPTER 1, "GENERAL DESCRIPTION," a brief discussion of the copier's features, specifications, and an explanation of its operation are given.

CHAPTER 2 "COPYING PROCESS" deals with the inner workings of the copier associated with the generation of copies.

CHAPTER 3 "OPERATIONS AND TIMING" explains how the copier's electrical and mechanical systems are related to each other with respect to functions and timing of operations.

In CHAPTER 4, "MECHANICAL SYSTEM," the copier's mechanical system is discussed as to its operation, disassembly, reassembly, and adjustment.

CHAPTER 5 "INSTALLATION" gives step-by-step instructions for installing the copier together with checks to make for each step.

CHAPTER 6 "MAINTENANCE AND SERVICING" contains tables of replacement parts and consumables.

In addition to the above chapters, this Service Manual contains a set of appendixes consisting of a general timing chart and general circuit diagrams.

A separate document entitled Service Handbook is also available for troubleshooting problems in the copier.

Note:

The contents of this manual may be updated from time to time to reflect improvements rendered to the copier; a Service Information Bulletin will be issued as necessary to cover major changes.

All service persons are expected to be thoroughly familiar with the information contained in this manual, Service Handbook, and Service Information Bulletins, for quick response to the user's needs.

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CHAPTER 1

GENERAL DESCRIPTION

I. FEATURES 1-1
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I. FEATURES

1. **Fixed copyboard with zooming.**
   - In addition to the default reproduction ratios, a ratio between 70% and 141% may be selected.

2. **Designed with considerations for the environment.**
   - The use of a charging roller helps to limit the generation of ozone; average of 0.01 ppm or less, maximum of 0.02 ppm or less. (1/100 to 1/000 of existing machines)

3. **Uses a SURF fixing assembly.**
   - The use of the SURF fixing mechanism enables a 0-sec wait time.
   - In addition, the maximum power consumption is 0.98 kW or less.

4. **Cassette accommodating various types of paper and 2-way pick-up.**
   - The universal cassette (about 250 sheets) accommodates paper of sizes between A4/LTR and A5/STMT.
   - In addition, sheets as large as A4/LTR to business card may be used (manual).

5. **Separate top unit.**
   - The copier's top unit may be opened to make jam removal easy.

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II. SPECIFICATIONS

A. Copier

1. Type

Body	Desktop
Copyboard	Fixed
Light source	Fluorescent lamp (17 W)
Lens	Fixed lens array
Photosensitive medium	OPC (24 dia.)

2. System

Copying		Indirect static reproduction
Charging		Roller (direct charging)
Exposure		Slit (moving light source)
Copy density adjustment		Automatic (AE) or manual
Development		Dry
Pick-up	Auto	Cassette (1 holder)
	Manual	Multifeeder
Separation		Curvature separation + static eliminator
Fixing		Flat heater
Cleaning		Blade
Original orientation		Center reference (copyboard)

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3. Performance

Original type		Sheet, book, 3-D object (2 kg max.)	
Maximum original size		A4/LTR, (LGL)	
Maximum original size		1 : 1	
Reproduction ratio	DIRECT	1 : 1	
		115V	220/240V
	REDUCE I	1 : 0.707	1 : 0.707
	REDUCE II	1 : 0.786	
	REDUCE III		1 : 0.816
	REDUCE IV	1 : 0.860	
	ENLARGE I		1 : 1.154
	ENLARGE II	1 : 1.414	1 : 1.414
	ZOOM	70%~ 141% (in 1% increments)	
Wait time		0 sec (approx.; at 15°C/68°F)	
First copy time		10 sec (approx.; at 15°C/68°F, with scanning lamp heater ON)	
Continuous copying		100 copies (max.)	
Copying speed		See Table 1-101.	
Copy size		A4R/LTR-R (max.), business card (min.)	
Copy paper type	Cassette	Plain paper (64 to 80 g/m^2), tracing paper (GNT80), colored paper*	
	Multifeeder	Plain paper (52 to 128 g/m^2), tracing paper (GNT80), colored paper*, postcard*, transparencies*', business card (200 g/m^2 or less, 51×88 mm or more), label sheet*	
	Two-sided/ overlay Manual	Plain paper (60 to 128 g/m^2), colored paper*, postcard*, business card (200 g/m^2 or less, 51×88 mm /2.0×3.5 in. or more)	
Cassette		250 sheets, clawless, front loading, A4/LGL to A5/STM (universal)	
Multifeeder tray		5 mm /0.20 in. deep (approx.; about 50 sheets of 80 g/m^2 paper)	
Copy tray		100 sheets (approx.; A4, 80 g/m^2 paper)	
Non-image width	Leading edge	2.0±1.5 mm /0.08±0.06 in. (two-sided/overlay/one-sided)	
	Left/right	0.0+2.0-0.0 (A4), 0.0+4.0-0.0 (LGL/LTR) (two-sided/overlay/one-sided)	
Auto power off		Available (about 5 min; fixed)	

*As recommended by Canon.
'Single feeding only.

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4. Others

Operating environment	Temperature	7.5 to 32.5°C/45.5 to 90.5°F	
	Humidity	5 to 85%	
	Atmospheric pressure	810.60 to 1013.25hPa	
Power supply	115V 60Hz	Serial number	
		NP6012	NP6012F
		NUB xxxxx, NUC xxxxx	NUE xxxxx
	220/240V 50Hz	Serial number	
		NP6012	NP6212
		PTF xxxxx, UTG xxxxx, RTG xxxxx, TFA xxxxx	PTH xxxxx
Power consumption	Maximum	0.9 kW or less	
	Standby	about 20 W with scanning lamp heater ON about 17 W with scanning lamp heater OFF (approx.; about 5 min; reference only)	
	Copying	0.4 kWh (approx.; reference only)	
Noise	Standby	———	
	Copying	66 dB or less (sound power level under ISO)	
Ozone		0.01 ppm or less (average), 0.02 ppm or less (max.)	
Dimensions	Width	478 mm /18.8 in (approx.)	
	Depth	453 mm /17.8 in (approx.)	
	Height	290 mm /11.4 in (approx.)	
Weight		20.0 kg /44.0lb (approx.; including cassette)	
Consumables	Copy paper	Keep wrapped to protect against humidity.	
	Toner	Avoid direct sunshine; keep at 40°C/85% or less.	

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Ratio mode		Size	Paper size	Copies/min
DIRECT		A4R	A4R	12
		B5R	B5R	12
		A5R	A5R	12
		LGL	LGL	10
		LTR-R	LTR-R	12
		STMT-R	STMT-R	12
REDUCE	I	A4R → A5R	A5R	12
	II	LGL → LTR-R	LTR-R	12
	III	B5R → A5R	A5R	12
	IV	MARJIN	LTR-R	12
ENLARGE	I	B5R → A5R	A5R	10
	II	A5R → A4R	A4R	9

Table 1-101

B. ADF

Item		Specifications	Remarks
Original pick-up		Automatic pick-up / delivery	
Original placement		Face down	Place the first page at the bottom.
Original orientation		Center reference	
Original separation		Top (top original picked up first)	
Original type		50 to 128 g/m² (sheet ; one-side)	
Original size		A4 (LTR) to A5 (STMT), LGL	
Original tray capacity		30 sheets (stack height about 3 mm/0.1 in)	Paper of 80 g/m² or less.
Original processing		One-sided originals	
Original size identification		Yes (in feeding direction)	Not linked with the copier.
Original detection at strat		Yes	Linked with the copier.
Size	Width	474mm/18.8 in (approx.; with tray open, about 659mm/25.9 in)	
	Depth	394mm/15.5 in (approx.)	
	Height	74mm/2.9 in (approx.)	
Weight		5kg/11 lb (approx.)	
Power supply		+24 VDC, +5 VDC (from copier)	
Maximum power consumption		40 W or less	

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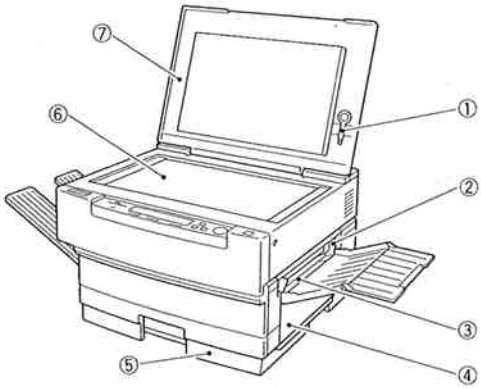
III. NAMES OF PARTS

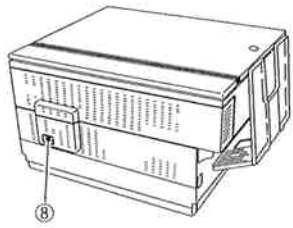
A. External View

1. NP6012



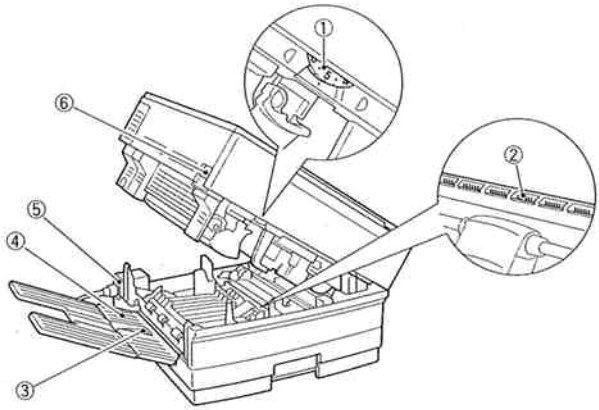
① Static eliminator cleaner
② Slide guide
③ Multifeeder
④ Right door
⑤ Cassette
⑥ Copyboard glass

Figure 1-301



⑦ Copyboard cover
⑧ Scanning lamp heater switch

Figure 1-302



① Copy density correction dial
② Static eliminator
③ Delivery guide plate
④ Copy tray
⑤ Power cord connector
⑥ Open/close lever

Figure 1-303

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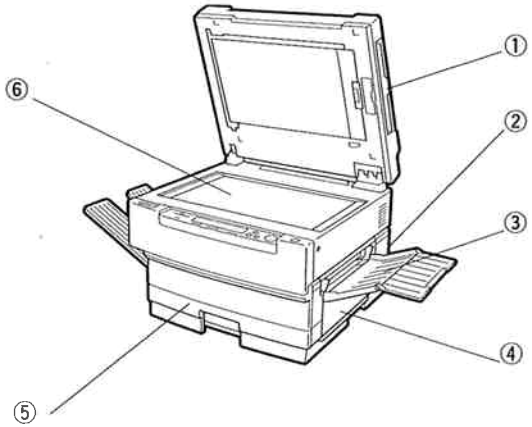
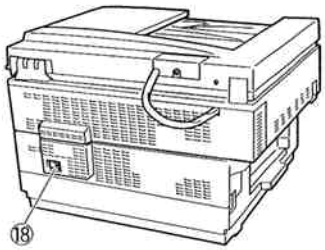
2. NP6012F / NP6212



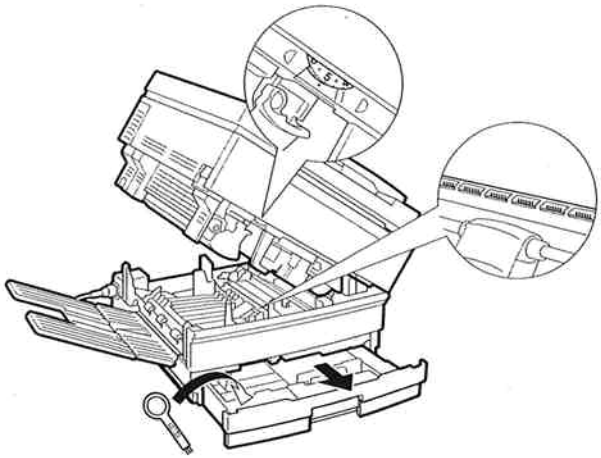
① ADF
② Slide guide
③ Multifeeder
④ Right door
⑤ Cassette
⑥ Copyboard glass

Figure 1-304



⑦ Scanning lamp heater switch

Figure 1-305



① Copy density correction dial
② Static eliminator
③ Delivery guide plate
④ Copy tray
⑤ Power cord connector
⑥ Open/close lever
⑦ Static eliminator cleaner

Figure 1-306

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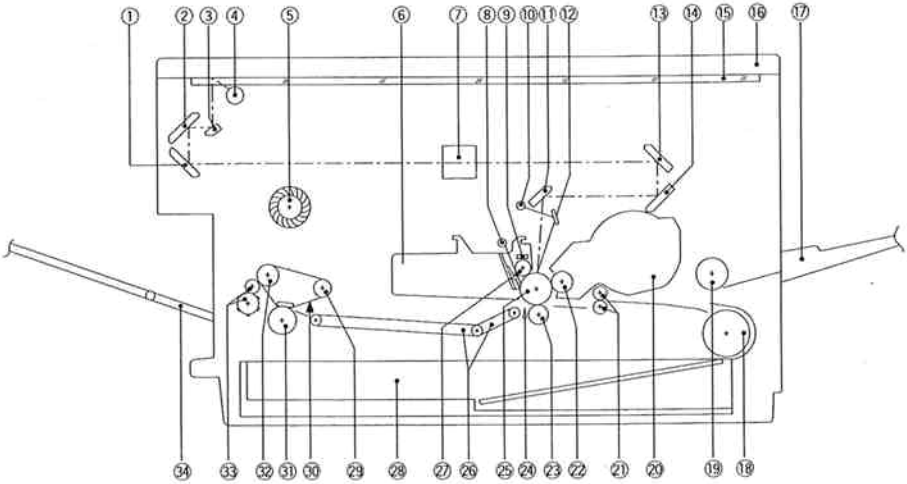
B. Cross Section

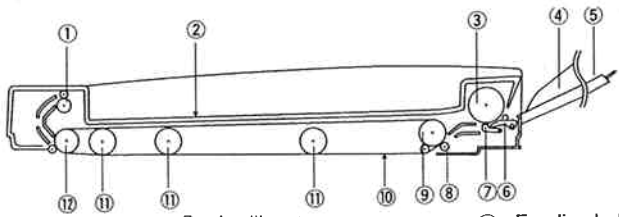
1. Copier



① No. 3 mirror
② No. 2 mirror
③ No. 1 mirror
④ Scanning lamp
⑤ Heat exhaust fan
⑥ Drum unit
⑦ Lens array
⑧ Pre-exposure lamp
⑨ No. 1 charging roller cleaning pad
⑩ Side blank exposure lamp
⑪ No. 6 mirror
⑫ Reflecting plate
⑬ No. 4 mirror
⑭ No. 5 mirror
⑮ Copyboard glass
⑯ Copyboard cover
⑰ Multifeeder tray
⑱ Cassette pick-up roller
⑲ Multifeeder pick-up roller
⑳ Developing assembly
㉑ Registration roller
㉒ Developing cylinder
㉓ Transfer roller
㉔ Static eliminator
㉕ Photosensitive drum
㉖ Feeding assembly
㉗ Primary charging roller
㉘ Cassette
㉙ Fixing film tension roller
㉚ Fixing film
㉛ Lower fixing roller
㉜ Fixing film drive roller
㉝ Delivery roller
㉞ Delivery tray

Figure 1-307

2.ADF



① Delivery roller
② Delivery tray
③ Pick-up roller
④ Original tray
⑤ Auxiliary tray
⑥ Guide plate
⑦ Separation pad
⑧ Registration roller
⑨ Feeding belt drive roller
⑩ Feeding belt
⑪ Feeding belt roll
⑫ Feeding belt link roller

Figure 1-308

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IV. OPERATIONS

A. Control Panel

1. NP6012

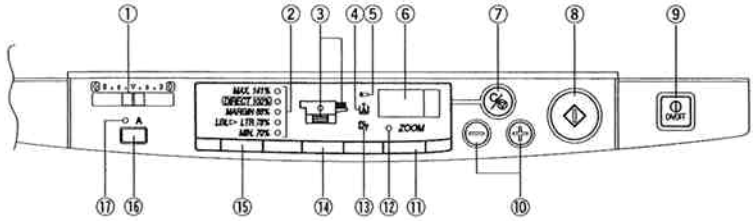

Figure 1-401a (Inch-configuration)

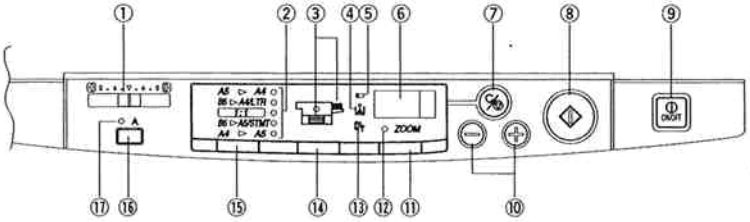

Figure 1-401b (AB/Inch-configuration)

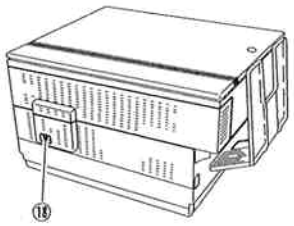

Figure 1-401c

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2. NP6012/NP6212

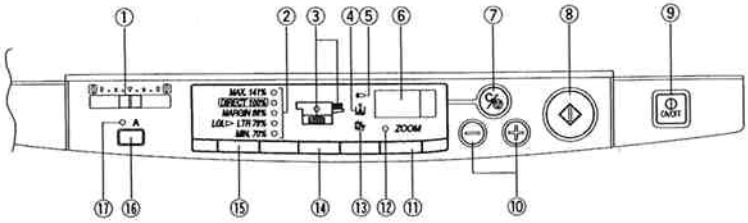

Figure 1-401d (NP6012F)

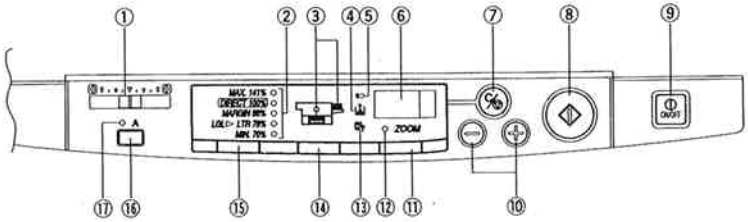

Figure 1-401e (NP6212)

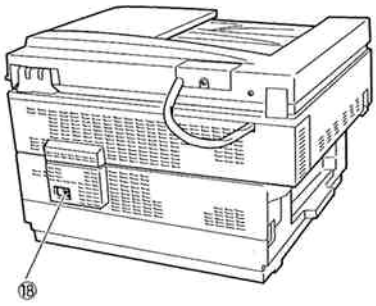

Figure 1-401f

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Ref.	Name	Description	Remarks
1	Copy Density Adjust lever	Use it to manually adjust the copy density.	
2	Ratio indicator	Indicates the selected reproduction ratio.	
3	Paper Select/ Add Paper indicator	• Indicates the selected cassette or multifeeder. • Flashes when paper runs out.	
4	Replace Toner Cartridge indicator	Flashes when the toner cartridge must be replaced.	
5	Replace Drum Unit indicator	If the model has the drum unit replacement time auto indication function, flashes then remains on when the drum unit must be replaced and remains on when the waste toner must be disposed of. If the model does not have the function, flashes when the waste toner must be disposed of.	
6	Copy Count/ Ratio indicator	Indicates the copy count or reproduction ratio.	100 (max.; continuous copying)
7	Clear/Stop key	Stops copying or returns the copy mode to default*.	*Default Mode Reproduction ratio: 100% Copy count: 1 Paper select: cassette Copy density: AE
8	Copy Start key	Starts copying.	
9	Power switch	Turns on and off the power.	
10	Copy Count/ Zoom Set key	Sets a copy count or a reproduction ratio.	
11	Zoom Mode key	Selects or deselects zoom mode.	
12	Zoom indicator	Turns on when zoom mode is selected.	
13	Jam indicator	Flashes when a jam occurs.	
14	Paper Select key	Selects the cassette as the source of paper or Selects the multifeeder.	
15	Default Ratio key	Selects a default reproduction ratio.	May be between 70% and 141% in 1% increments.
16	AE key	Selects or deselects AE mode.	
17	AE indicator	Turns on when AE is selected.	
18	Scanning Lamp Heater switch	Prevents delayed first copy time in a cold environment. OFF at time of shipment.	

Table 1-401

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B. Basic Copying Operations

1) Turn on the power switch.
   - The wait time is 0 sec.
   - The auto power-off mechanism becomes activated to automatically turn off the power if no key is operated in about 5 min.
2) If you are not using the ADF, lift the copyboard cover, and place an original face down along the size index.
   a. Place the original so that its center is aligned against the arrow (→); then, bring down the copyboard cover.

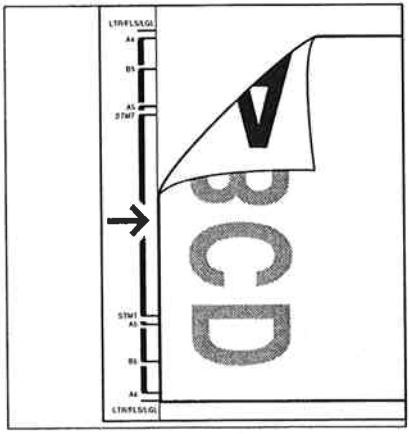
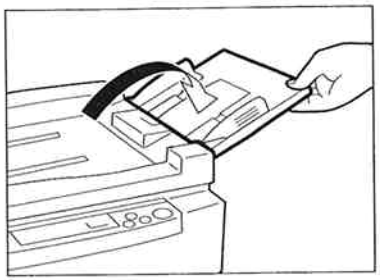
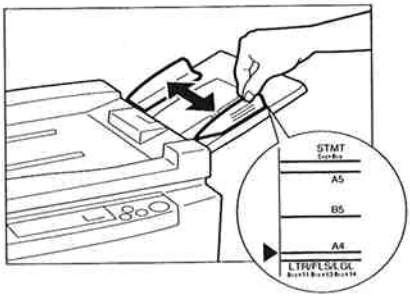


Figure 1-402





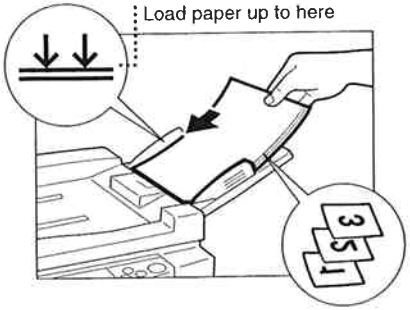


Figure 1-403

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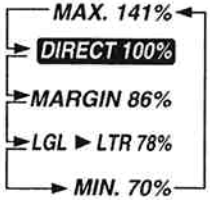
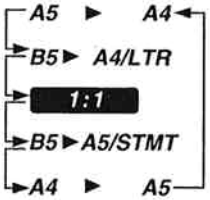
3) If you need to manually adjust the copy density, deselect AE and use the Copy Density Adjust lever.
4) As necessary, press the Default Ratio key or Zoom key.
   a. When you press the Zoom key, '%' appears on the Copy Count/Ratio indicator so that you may set the ratio between 70% and 141% in 1% increments.
   '%' disappears if the Copy Count/ Ratio key is not operated in about 3 sec.
   b. When you press the Default Ratio key, the ratio changes as follows for each press:



(Inch- configuration)



(AB/Inch- configuration)

5) If you are using the multifeeder, press the Paper Select key.
6) Check that the '%' notation on the Copy Count/Ratio indicator has turned off; then, set the number of copies to make using the Copy Count/Zoom Set key. (The count should appear on the Copy Count indicator.)
7) Press the Copy Start key.
   a. As may copies as you have specified will be made automatically.
   b. No other keys than the Clear/Stop key or Copy Density adjustment lever/AE OFF will be accepted until the last copy has been made.
   c. You may switch from automatic density adjustment mode to manual density adjustment mode between copying has started and the last copy is made; however, you cannot switch from manual density adjustment mode to automatic density adjustment.
   d. When copying is finished, the Copy Count indicator indicates the initial copy count. If copying stopped as a result of the absence of paper, a press on the Copy Start key after supplying paper will automatically make the remaining number of copies.
   e. To stop copying operation during continuous copying, press the Clear/Stop key; the ongoing copy run is finished before the operation stops. (At this time, the Copy Count indicator indicates the initial count.)
   f. If paper jams, the JAM indicator will flash and copying operation stops; open the top unit. (The power turns off when the top unit is opened for removal of the jam.)
   g. After copying operation is over, the auto power-off mechanism becomes activated if the copier is left alone for about 5 min without further key operation, automatically turning off the power.

1. Using Transparencies

1) Shift the delivery guide plate on the copy tray upright.

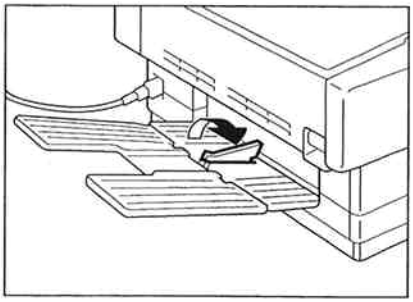


Figure 1-404

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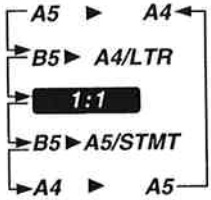
2) Place an original on the copyboard, and close the copyboard cover.
3) If you want to manually adjust the copy density, deselect AE, and operate the Copy Density Adjust lever.
4) Press the Default Ratio key or Zoom Mode key to suit the reproduction ratio you want.
   a. When you press the Zoom key, you may set the ratio between 70% and 141% in 1% increments.
   b. When you press the Default Ratio key, the ratio changes as follows for each press:

(Inch- configuration)



(AB/Inch- configuration)

5) Place a single transparency on the singlefeeder.
   • You must not set more than one transparency on the singlefeeder.
6) Select the multifeeder using the Paper Select key.
7) Set the copy count you want using the Copy Count/Zoom Set key; then, check the Copy Count indicator.
8) Press the Copy Start key.
   • Be sure to remove each transparency delivered to the copy tray before the next one is delivered.

If the Transparency Is Not Picked Up Smoothly

• Under certain environmental conditions, transparencies may fail to move into the machine in response to a press on the Copy Start key. If this is the case, go through the following:

1) Place copy paper underneath the transparency with a displacement of about 1 cm.

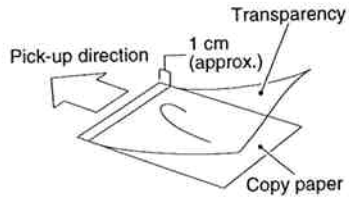


Figure 1-405

2) Set the transparency together with the copy paper on the multifeeder while holding the trailing edge of the copy paper.
3) Press the Copy Start key while still holding the trailing edge of the copy paper; hang on to the copy paper, and remove it when the transparency has disappeared into the machine.

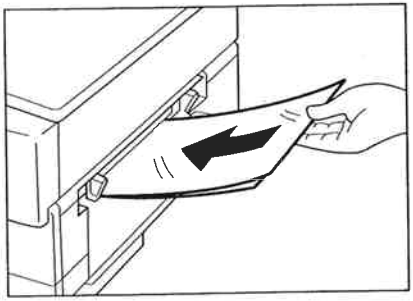


Figure 1-406

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2. Making Two-Sided Copies

You can make two-sided copies using the multifeeder; however, you must keep the following in mind:

① After the first copy run, turn over the copy paper and set it as shown in Figure 1-406

② Make sure the paper is not moist.
③ Make sure that the paper is not curled.
④ Make sure that the paper is of 64 to 128 g/m² (business card, 200 g/m² or less).
⑤ In the case of a two-sided copy, each side may not be used more than once.
⑥ After the first copy run, cool the paper sufficiently and remove the curl before feeding it for the second copy run.

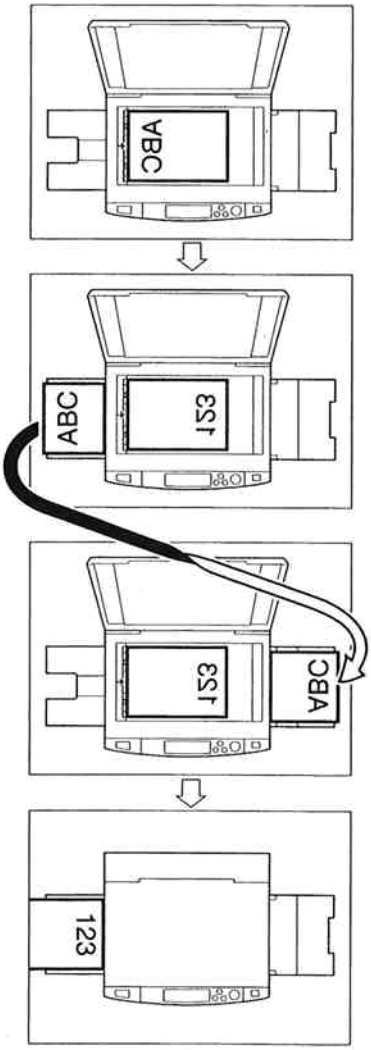

Figure 1-407

C. User Mode

1. Outline

The copier offers user mode which may be used by the user to change various settings.

No.	Count/ratio	Function	Description	Remarks
1	U1	Primary charging roller cleaning mode	Executes cleaning of the primary charging roller. The cleaning lasts about 3 sec, and stops automatically.	
2	U2	Copy count indication mode	Indicates the number of copies made by the installed drum unit.	Only in model with drum unit replacement time automatic indication function.
3	U3	Drum unit replacement indicator off mode	Turns off the flashing Replace Drum Unit indicator.	Only in model with drum unit replacement time automatic indication function.
4	U6	ADF cleaning mode	Clean the ADF's original feeding path.	NP6012F / NP6212 only.
5	U7	Installation/drum unit replacement mode	Used to enter data necessary when installing the machine or replacing the drum unit. Further, execute it after executing '34' or '37' in service mode.	Only in model without drum unit replacement time automatic indication function.

Table 1-402

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2. Using User Mode

1) Turn on the copier, and hold down the AE key for 4 sec or more.
   - 'U1' appears on the count/ratio indicator.

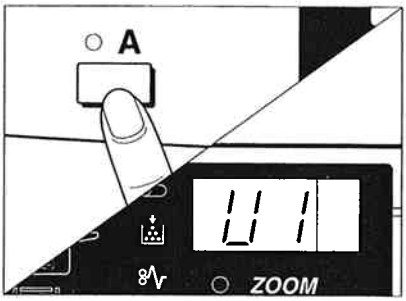

Figure 1-408

2) Press the +/- key so that the appropriate function number (U1 through U7) appears.
3) To end user mode, press the AE key.

Caution:

- You cannot start user mode while copies are being made or when a jam or an error has occurred.
- The auto power-off function remains disabled while user mode is being executed.

3. Primary Charging Roller Cleaning Mode (U1)

1) Operate so thát 'U1' appears on the count/ratio indicator; then, press the Copy Start key.
   - 'U1' starts to flash to indicate the execution of cleaning; cleaning takes about 3 sec.
   - 'U1' stops flashing and remains on when cleaning is finished.

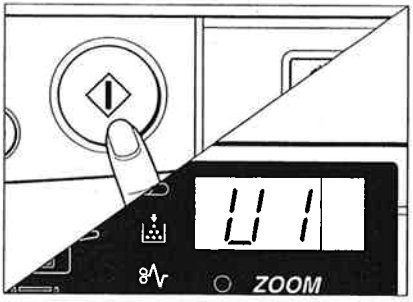

Figure 1-409

2) To end user mode, press the AE key.
   - The AE key remains disabled while user mode is being executed.

4. Copy Count Indication Mode* (U2)

*Only for a model with the drum unit replacement time automatic indication function.

1) Operate so that 'U2' appears on the count/ratio indicator; then, press the Copy Start key.

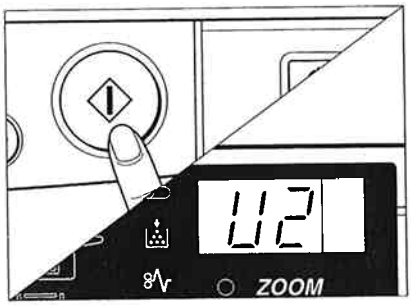

Figure 1-410

- The count/ratio indicator alternately indicates the 1000s and the 100s; for example, in the case of 12345, it indicates '1' and '23' alternately.

2) To end user mode, press the Copy Start key and then the AE key.
   - The AE key remains disabled while a copy count is being indicated.

5. Drum Unit Replacement Off Mode* (U3)

*Only for a model with the drum unit replacement time automatic indication function.

1) Operate so that 'U3' appears on the count/ratio indicator; then, press the Copy Start key.
   - 'U3' remains; however, the Replace Drum Unit indicator stops flashing and goes out.

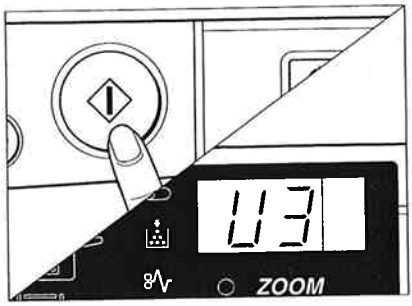

Figure 1-411

2) To end user mode, press the AE key.

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6. ADF Cleaning Mode (NP6012/NP6212 only)

1) Place about 10 sheets of white copy paper on the original tray of the ADF.
2) Operate so that 'U6' appears on the count/ratio indicator; then, press the Copy Start key.
   • The sheets of copy paper on the original tray of the ADF will be picked up in sequence.

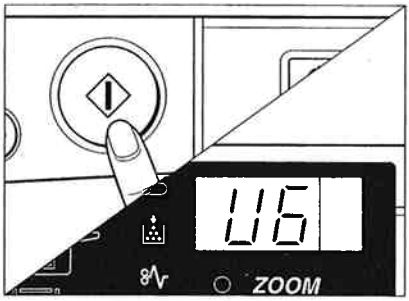

Figure1-412

3) To end user mode, press the AE key.

7. Installation/Drum Unit Replacement Mode (U7)

*Only for a model with the drum unit replacement time automatic indication function.

1) Operate so that 'U7' appears on the count/ratio indicator; then, press the Copy Start key.
   • The indication changes to '71'.

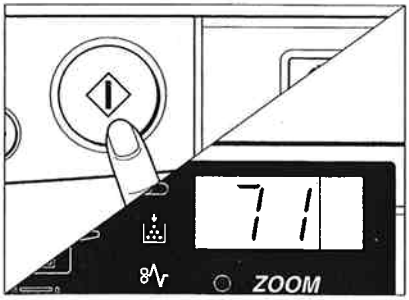

Figure 1-413

2) Using the +/- key, enter the value of 'PRIMARY' recorded on the drum unit.
   • Appears in the top left of the count/ratio indicator while a value is being entered.

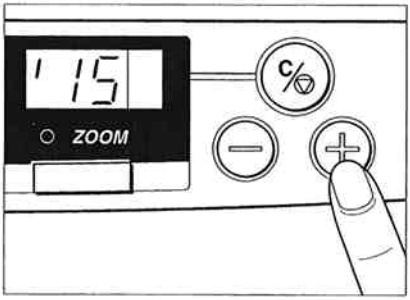

Figure 1-414

3) After entering the value of 'PRIMRY', press the Copy Start key to store the value.
   • A press on the Copy Start key changes the indication to '72'.

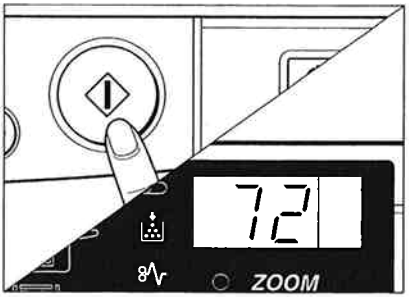

Figure 1-415

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4) Using the +/- key, enter the value under 'IP_OFST' recorded on the drum unit.
   - Appears in the top left of the count/ratio indicator while a value is being entered.

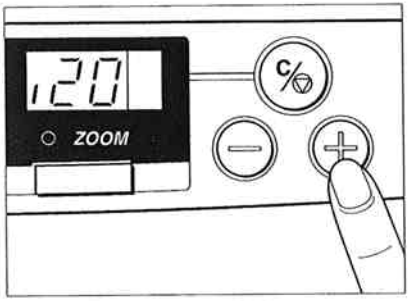

Figure 1-416

5) After entering the value of 'IP_OFST', press the Copy Start key to store the value.
   - A press on the Copy Start key changes the indication to '73'.

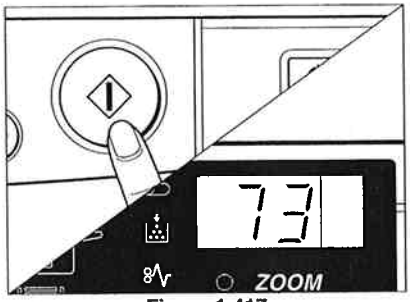

Figure 1-417

6) Press the Copy Start key to execute drum sensitivity automatic adjustment and toner stirring.
   - The main motor will rotate, and drum sensitivity automatic adjustment and toner stirring will start.
   - After the execution, the copier ends user mode automatically and stops operation in about 1 min.
   - A press on the AE key while the above execution is taking place ends user mode; however, the AE key will not be accepted while a setting is displayed or the main motor is rotating.

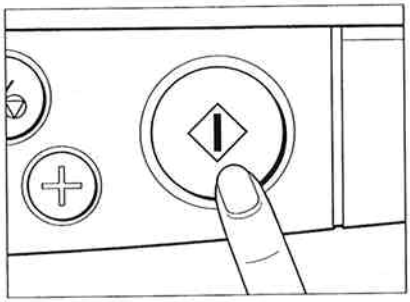

Figure 1-418

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D. Removing Jams

The Jam indicator flashes to indicate the presence of a jam inside the machine.

① Remove the jam with care so as not to tear it. Be sure to remove all pieces of paper if it has torn.

1) Check the multifeeder for a jam. To remove, pull the paper slowly out of the multifeeder.
2) Open the right cover, and check if there is copy paper. Remove the paper if found.
3) Shift the open/close lever to open the body.

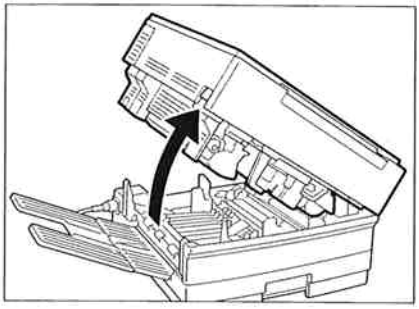

Figure 1-419

4) Pull out any jam from inside the machine with care.

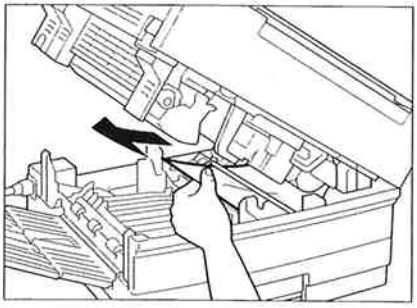

Figure 1-420

E. Adding Paper

The Add Paper indictor 'P' turns on in response to the following conditions:

① When the cassette has run out of paper.
② When the cassette is in the cassette holder.
③ When the Copy Start key is pressed without paper on the multifeeder.

1) Check if paper is set in the cassette.
2) If the cassette is out of paper, set copy paper.
   If there is paper in the cassette, go through the following:
   ① Open the right door, and check if there is a jam. Remove it if any.
   ② Take out the stack of paper from the cassette, put the sheets in order, and set the stack back in.
   ③ Make sure that the cassette is properly set in the cassette holder.
3) Press the Copy Start key.
   ① The 'P' indication should go off, and the copier will make the remaining number of copies.

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F. Replace Toner Cartridge Indicator (⊂⊃) and Action to Take

The replace toner cartridge indicator (⊂⊃) starts to flash when toner runs out; perform the following to replenish the cartridge:

1) Lift the body open/close lever to open the body.

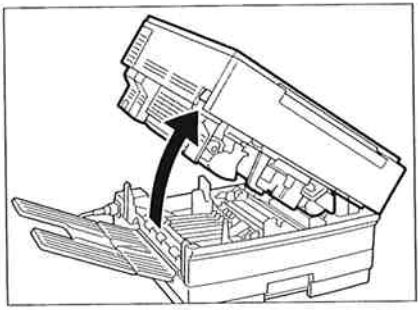

Figure 1-421

2) Turn the toner cartridge clockwise until it stops, and pull out the cartridge.

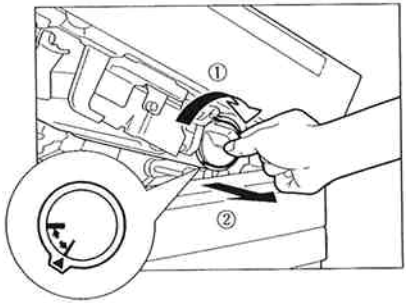

Figure 1-422

3) Hold the toner cartridge level, and shake it left and right several times.

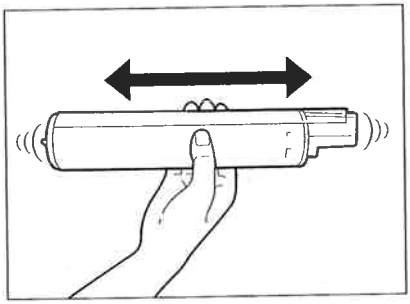

Figure 1-423

4) Insert the toner cartridge carefully until it stops.

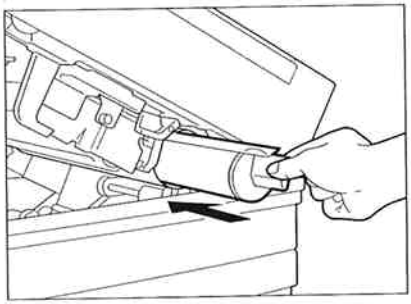

Figure 1-424

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5) While holding the toner cartridge in place, pull the OPEN seal straight to the front to peel it.

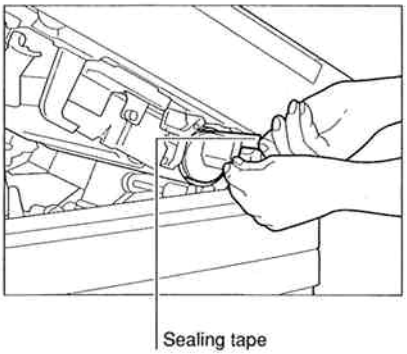

Figure 1-425

⚠Caution:
Never dispose of a sealing tape in a fire or incinerator.

6) Turn the toner cartridge counterclockwise until it stops.

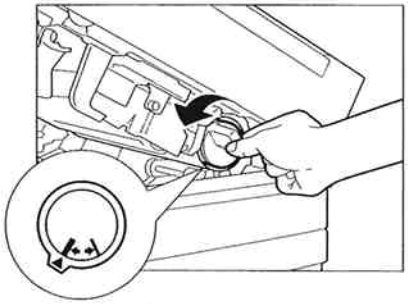

Figure 1-426

7) Press on the "✋" mark on the body to close it firmly.

⚠Caution:
Do NOT throw the toner cartridge into fire; it can burst or explode.

G. Using the Density Correction Dial

If the copy density is too high, i.e., the image is too dark, in density adjustment mode (AE or manual), you may adjust the copy density using the Density Correction dial.

1) Shift up the open/close lever to open the body.
2) Adjust the position of the density correction dial.

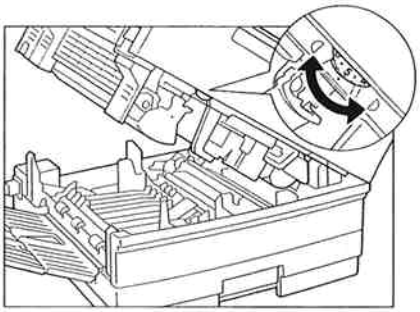

Figure 1-427

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H. Using the Scanning Lamp Heater Switch

If the site of installation is subject to low temperature or the first time copy is subject to a delay, make use of the scanning lamp heater to prevent problems.

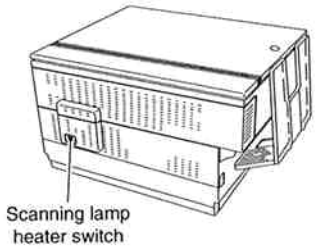

Figure 1-428

Caution:
The scanning lamp heater is activated when the heater switch is turned on while the power plug is connected (regardless of whether the copier's power switch is off).

I. Cleaning

If the images tend to be soiled or copy paper tends to jam frequently, advise the user to clean the following parts:

1. If Images are Soiled

a. Copyboard Glass/Copyboard Cover
Wipe it with a moist cloth; then, dry wipe it. If the dirt cannot be removed, wipe it with a cloth moistened with mild detergent solution, and dry wipe it.

b. Cassette Pick-Up Roller
1) Remove the cassette.
2) Open the right cover.
3) Keep the separation pad down, wipe the cassette pick-up roller with a cloth moistened with alcohol or water* while rotating the roller in the direction of pick-up.
*Be sure to wring it well.

Caution:
Do not make copies until the cassette pick-up roller has dried completely.

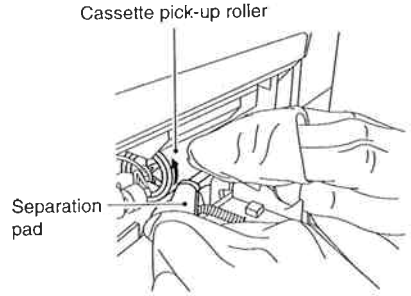

Figure 1-429

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c. Multi Pick-Up Roller

1) Lift the open/close lever to open the body.
2) Place one sheet of copy paper (A4) in the feeding path.
3) Keep the separation pad down, and wipe the multi pick-up roller with a cloth moistened with alcohol or water* while rotating the multi pick-up roller in the direction of pick-up.
*Be sure to wring it well.

Caution:

1. Do not touch the photo sensitive drum.
2. Do not make copies until the multi pick-up roller has dried completely.

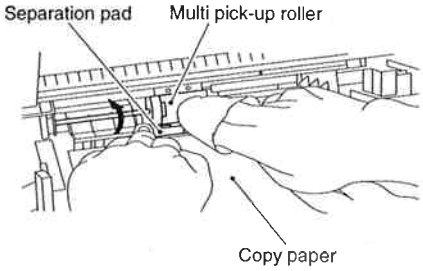

Figure 1-430

d. Feeding Belt (NP6012F/NP6212 only)

1) Wipe the feeding belt while moving it in the direction of the arrow with a cloth moistened with water; be sure to wring the cloth well.

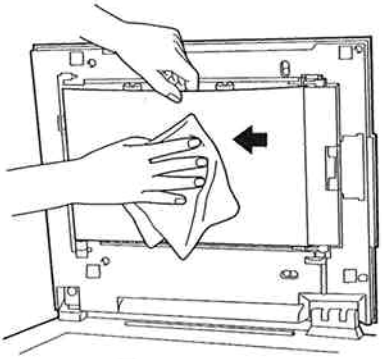

Figure 1-431

e. Separation Pad (NP6012F/NP6212 only)

1) Remove the ADF from the copier. (See IX. of CHAPTER 4 for the steps to follow.)
2) Detach the separation pad cover using a coin or the like.

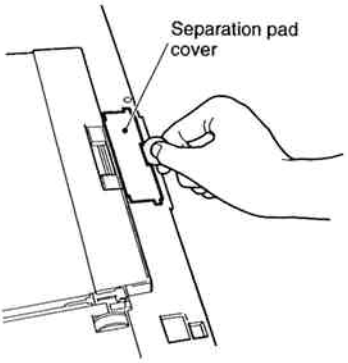

Figure 1-432

3) Remove the separation pad unit.

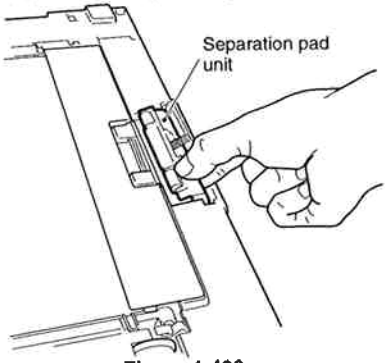

Figure 1-433

4) Dry-wipe the surface of the separation pad.

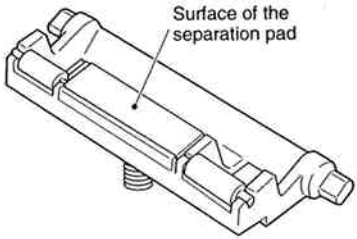

Figure 1-434

5) Install the separation pad unit while orienting it as indicated.

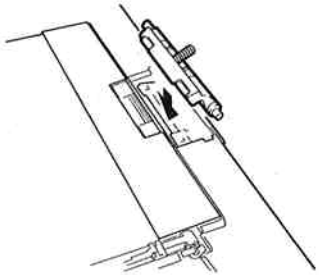

Figure 1-435

f. Pick-Up Roller

You must clean the pick-up roller whenever you have replaced the separation pad.

1) Remove the separation pad unit.
2) Wipe the pick-up roller while moving it in pick-up direction with a cloth moistened with alcohol or water; be sure to wring the cloth well before bringing it into contact with the roller.

Caution:
Do not make copies until the pick-up roller has dried copletely.

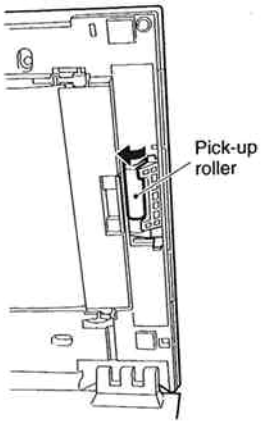

Figure 1-436

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2. Frequent Jams

a. Static Eliminator

1) Open the copyboard cover, and remove the static eliminator cleaner.

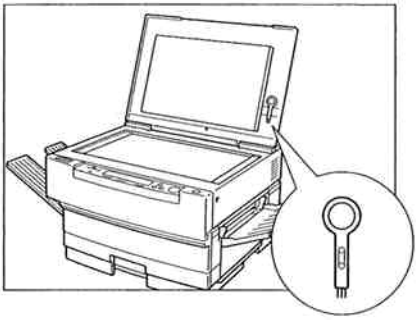

Figure 1-437(NP6012)

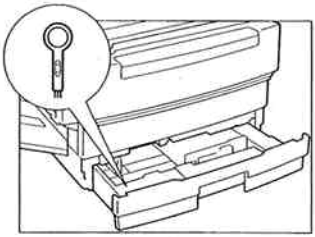

Figure 1-438(NP6012F/NP6212)

2) Shift up the open/close lever to open the body.

3) Clean the static eliminator with the static eliminator cleaner.

① Brush out any dirt (paper lint, for example) from the groove in the static eliminator.

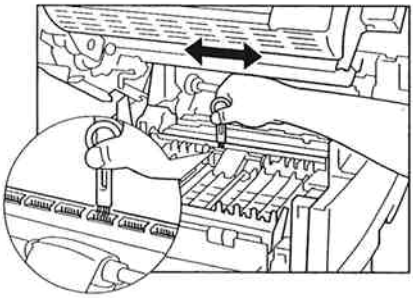

Figure 1-439

4) Close the body as soon as you have finished cleaning.

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J. Points to Note When Closing the Top Unit

Make sure of the following three points before closing the top unit.

1. The drum unit has been installed, and the drum unit lever is at the LOCK position.

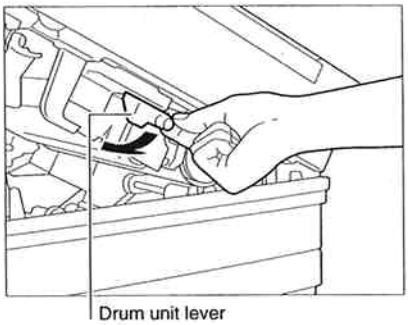

Figure 1-440

2. The toner cartridge has been turned and positioned as specified.

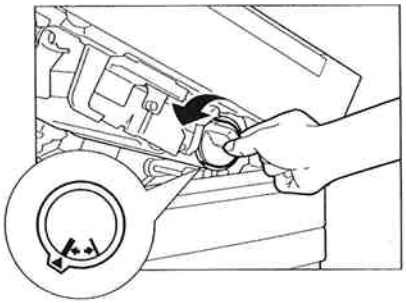

Figure 1-441

3. The fixing lever is at the LOCK position.

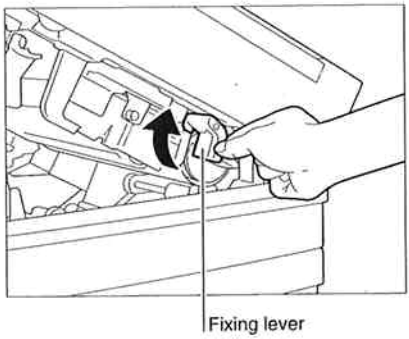

Figure 1-442

Unless the above three points are satisfied, the lock mechanism will activate, preventing the top unit from closing.

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CHAPTER 2

COPYING PROCESS

I. IMAGE FORMATION..... 2-1 II. AUXILIARY PROCESS 2-8

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I. IMAGE FORMATION

A. Outline

The copier uses a direct charging/transfer system with each component block arranged as shown in Figure 2-101.

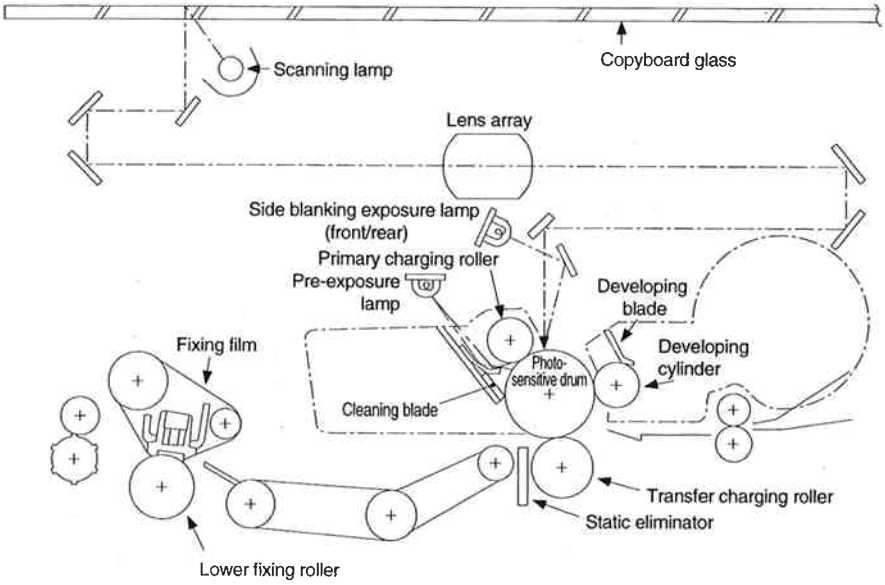

Figure 2-101

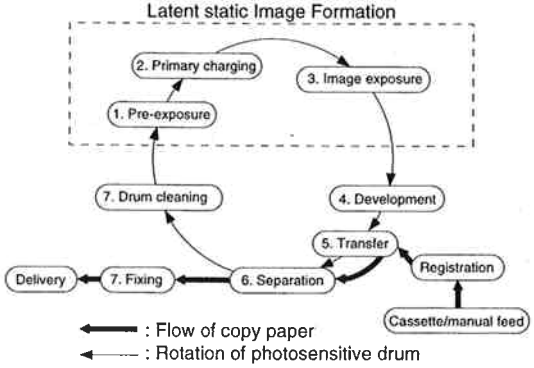

Figure 2-102

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The copier's image formation block consists of the following steps; see the descriptions for each step given under its respective heading:

Step 1: pre-exposure
Step 2: primary charging (-)
Step 3: image exposure
Step 4: development (AC + DC bias)
Step 5: transfer (-)
Step 6: separation (+)
Step 7: fixing
Step 8: drum cleaning

The photosensitive drum consists of two layers: the outer layer being a photoconductive layer made of organic photoconductor (OPC) and inner layer, a substrate made of aluminum (conductor).

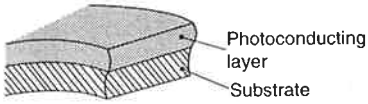

Figure 2-103

B. Static Latent Image Formation Block

The static latent image formation block consists of tow steps: primary charging and image exposure. At the end of this block, the areas on the photosensitive drum corresponding to the black areas of the original are left with negative charges and those corresponding to the white areas of the original are rid of negative charges.

These images created by negative charges are not visible to the human eye and, therefore, are called static latent images.

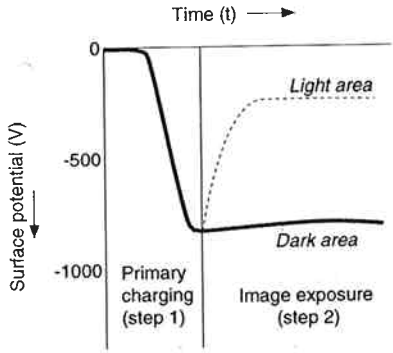

Figure 2-104

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C. Pre-Exposure (step 1)

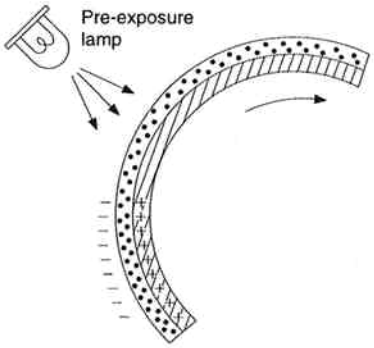

Figure 2-105

Prior to primary charging, the light of the pre-exposure lamp is directed to the surface of the photosensitive drum for pre-exposure, thereby removing the residual charges from the surface of the photosensitive drum to prevent uneven copy density.

D. Primary Charging (step 2)

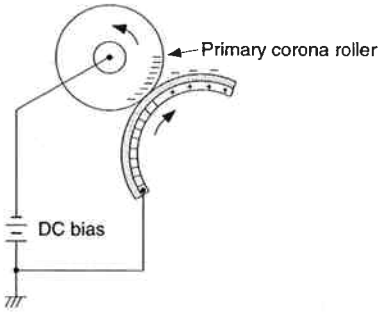

Figure 2-106

The surface of the photosensitive drum is charged to a uniform negative potential in preparation for the formation of static latent images.

The copier uses its primary charging roller to directly charge the photosensitive drum (primary charging).

The primary charging roller is made of conducting rubber, and a DC bias is applied to the roller.

Reference:

A direct charging system provides such advantages as low application voltage and generates little, if any, ozone.

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E. Image Exposure (step 3)

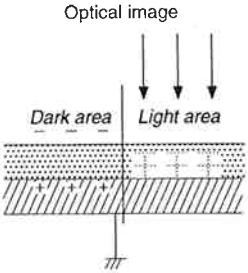

Figure 2-107

In this step, the optical image of the original is projected to the photosensitive drum to neutralize the charges in the light area.

F. Development (step 4)

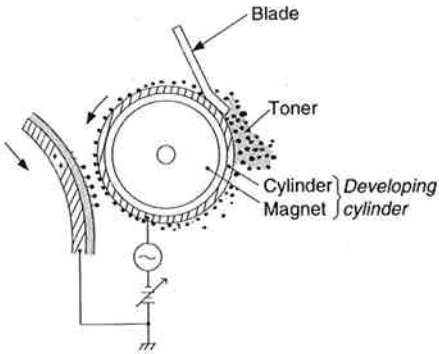

Figure 2-108

As shown in Figure 2-108, the developing assembly consists of a rubber blade and a developing cylinder constructed of a fixed magnet and a cylinder that rotates around it. The copier's toner is a one-component toner made mostly of magnetite and resins. The toner has insulating characteristics and becomes positively charged by the friction between the rotating cylinder and the blade.

The toner is moved between the rotating developing cylinder and a blade, where it is charged to a positive potential and deposited on the developing cylinder in a thin, uniform layer.

The developing cylinder receives both AC bias and DC bias (negative component) at the same time; the resulting bias is called *developing bias*. For this reason, the negative component of the developing bias is greater than the positive component.

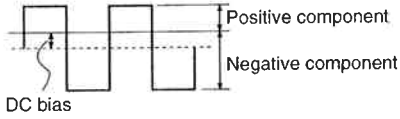

Figure 2-109

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During copying, the toner is attracted to the photosensitive drum by the photosensitive drum surface potential and the development bias (positive component), thus turning the static latent image into a visible image. Any excess toner is repelled by the photosensitive drum by the photosensitive drum surface potential and the developing bias (negative component).

A DC bias affects copy density and the degree of fogging; the higher, i.e., closer to 0 V, it is, the darker the images will be—however, with an increased tendency toward fogging.

G. Transfer (step 5)

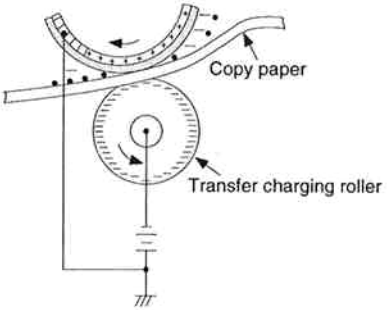

Figure 2-110

A negative voltage is applied to the back of copy paper to transfer toner from the surface of the transfer drum to the copy paper.

The copier uses a roller transfer system, which has the following advantages when compared with the conventional corona transfer system:

- Generates virtually no ozone.
- Provides good feeding, since copy paper is retained by both the transfer charging roller and the photosensitive drum.

Reference:

Toner may collect on the transfer roller if the image on the photosensitive drum fails to transfer to the copy paper because of a jam or the like.

The copier turns the transfer voltage to positive during initial rotation, while the scanner is moving in reverse, and during post rotation to return the positively charged toner adhering to the transfer roller to the photosensitive drum.

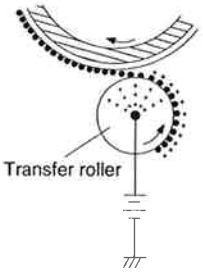

Figure 2-111

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H. Separation (step 6)

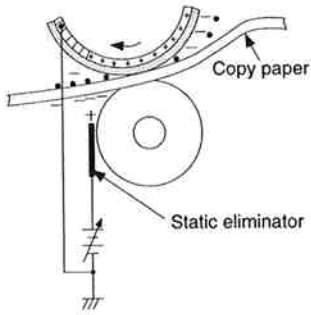

Figure 2-112

Copy paper is separated from the photosensitive drum using the rigidity of the paper. Thin paper, however, has low rigidity and can wrap around the photosensitive drum. To prevent such a problem, the copier applies a positive voltage to the separation static eliminator to weaken the static attraction between the photosensitive drum and copy paper, thereby facilitating separation.

I. Fixing (step 7)

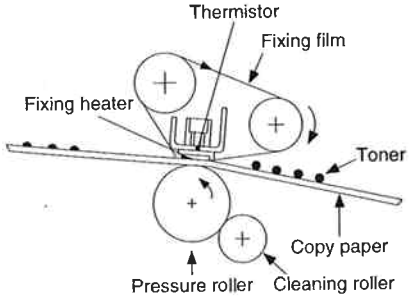

Figure 2-113

After transfer, the toner image is fixed to the paper while the copy paper moves through the fixing film and the pressure roller.

The fixing film has a seamless construction and is made of special material so that melting toner will not stick to the film—further, the surface of the pressure roller is cleaned by a cleaning roller.

The fixing heater is a flat heater and heats only the area where the fixing film comes into contact; this design eliminates the need for warm-up time.

The temperature of the fixing heater is monitored by the thermistor (TH1) located more or less at the center of the fixing heater and serves to make sure that the heater is controlled to a specific temperature.

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J. Drum Cleaning (step 8)

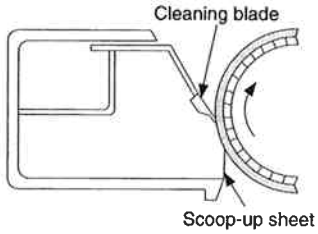

Figure 2-114

In preparation for the next copy run, the cleaning blade scrapes off the residual toner from the photosensitive drum by way of cleaning the photosensitive drum surface. The scoop-up sheet then is used to collect such toner.

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II. AUXILIARY PROCESS

1. Side Blank Exposure

Side blank exposure is used to prevent adhesion of excess toner to the drum by removing the residual potential in the non-image areas (front, rear) of the drum. See p. 3-35 for details.

2. Nip Exposure

In nip exposure, part of the light from the pre-exposure lamp is directed to the area where the photosensitive drum is in contact with the primary charging roller, thereby ensuring the stability of primary charging.

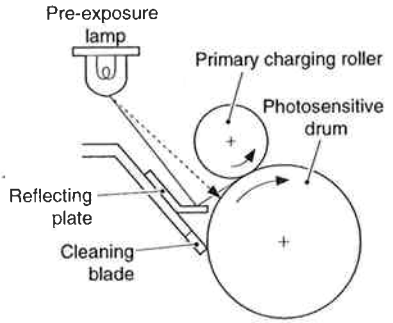

Figure 2-115

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CHAPTER 3

OPERATIONS AND TIMING

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I. BASIC OPERATION

A. Functional Construction

The copier can roughly be divided into four functional blocks: namely, pick-up/feeding, exposure, image formation, and control.

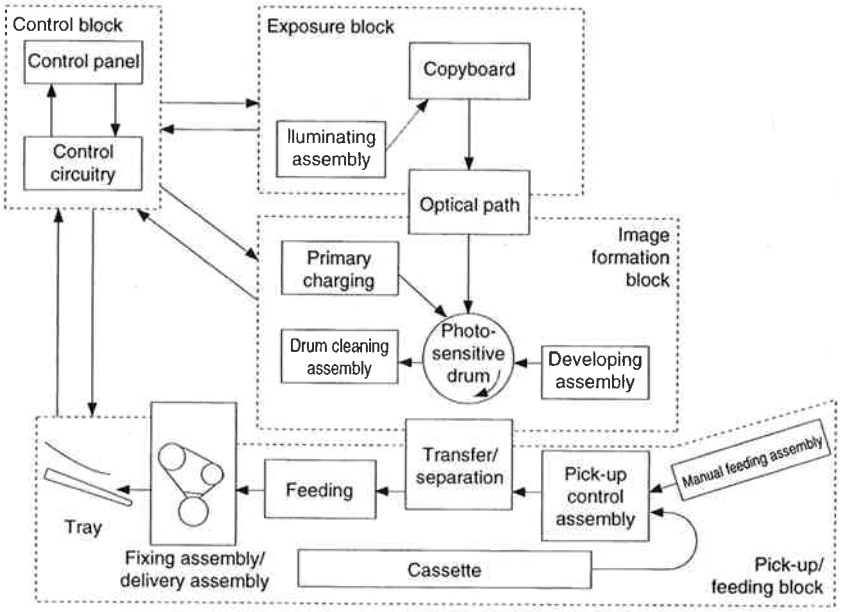

Figure 3-101

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B. Electrical Circuitry

The copier's major electrical control mechanisms are driven by the microprocessor on the DC controller PCB. The microprocessor reads input signals from the sensors and the operation keys in response to the instructions of the program stored in advance and generates signals used to drive such loads as motors, solenoids, and lamps.

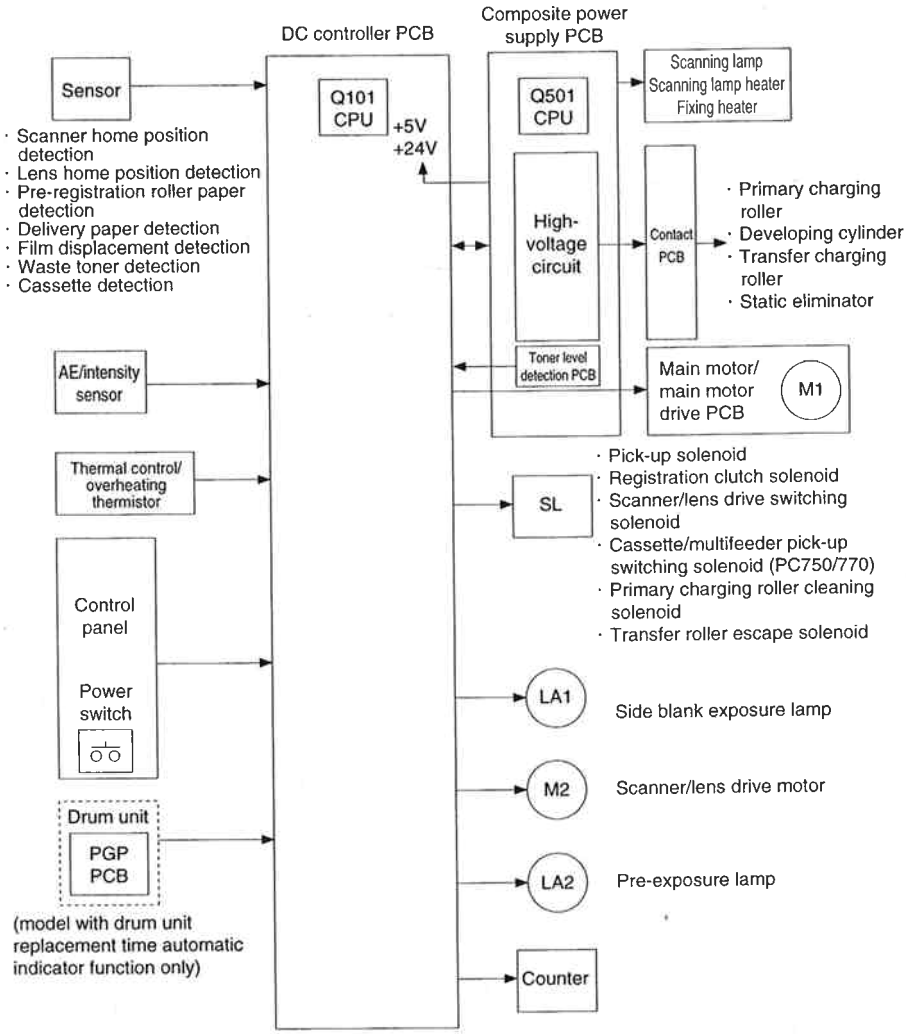

Figure 3-102

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C. Inputs to and Outputs from the DC Controller

1. Inputs to the DC Controller (1/2)

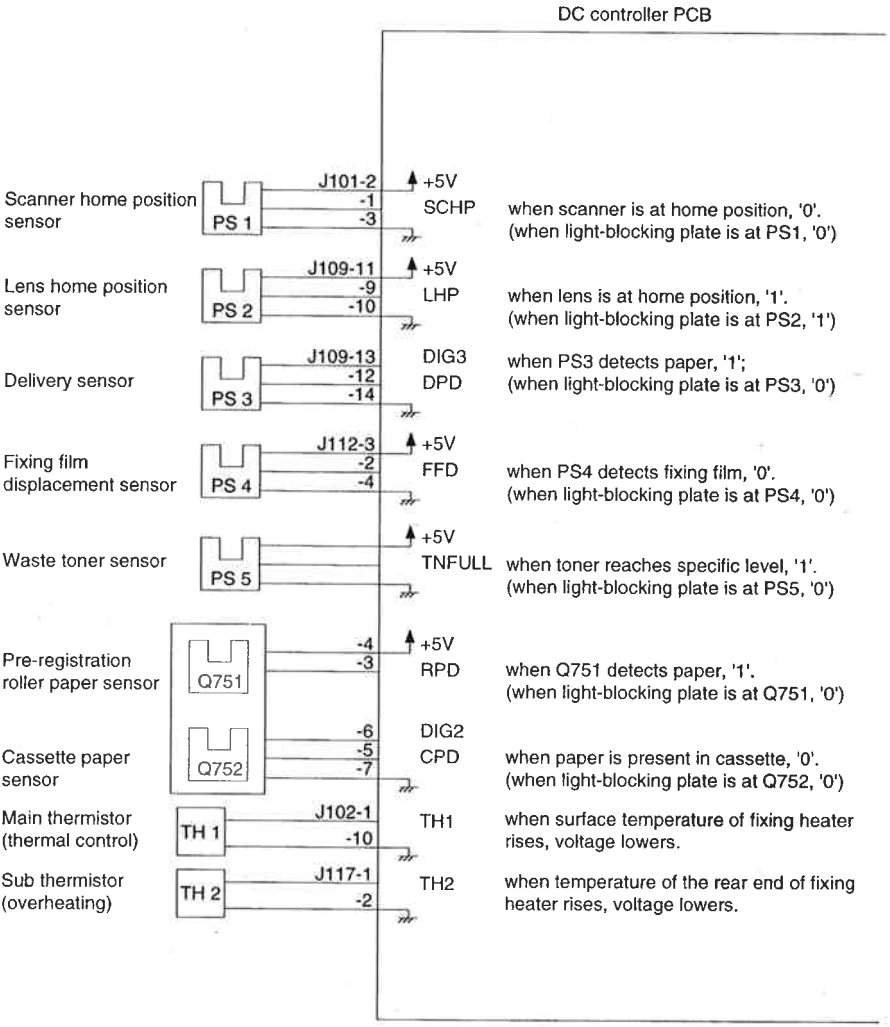

Figure 3-103

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2. Inputs to the DC Controller (2/2)

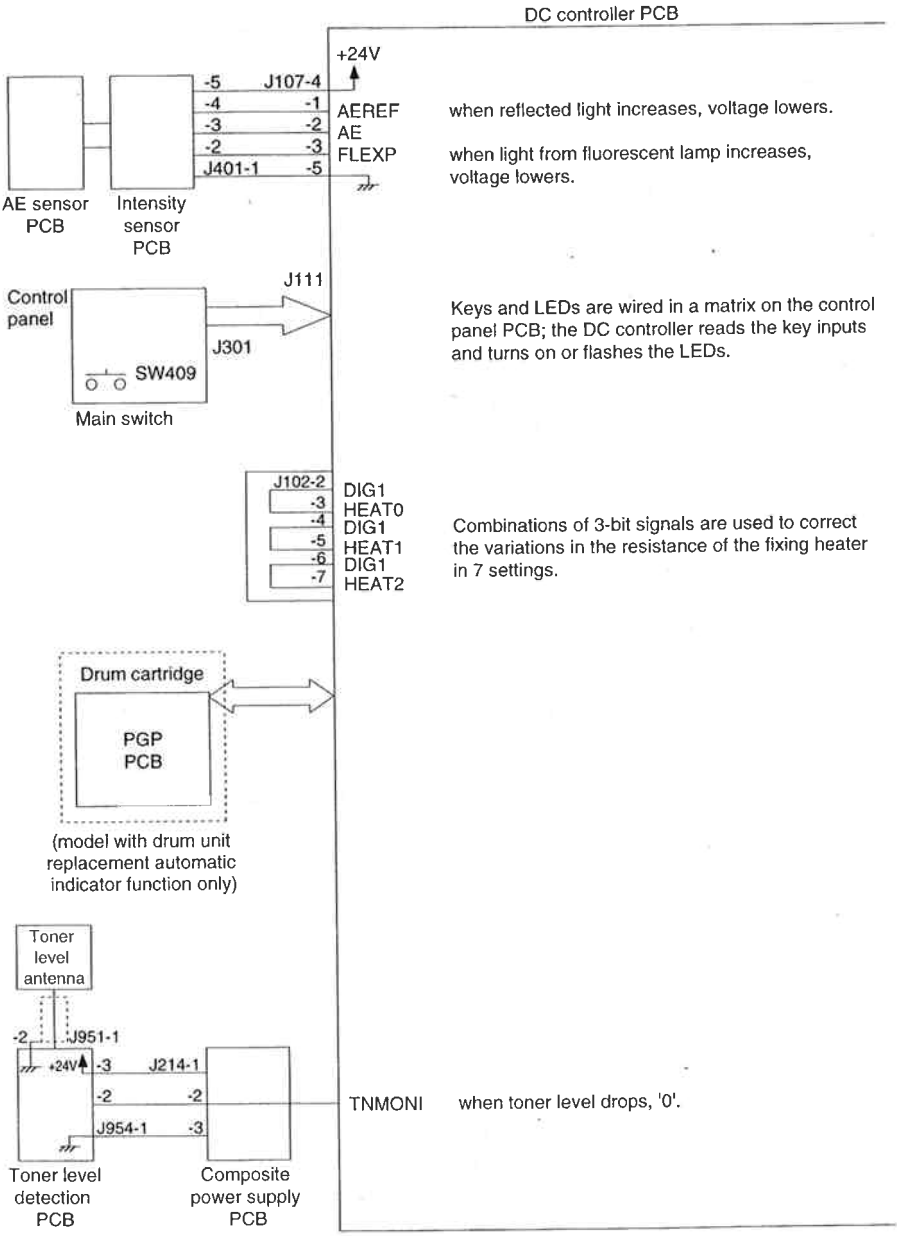

Figure 3-104

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D. Outputs from the DC Controller

1. Outputs from the DC Controller(1/2)

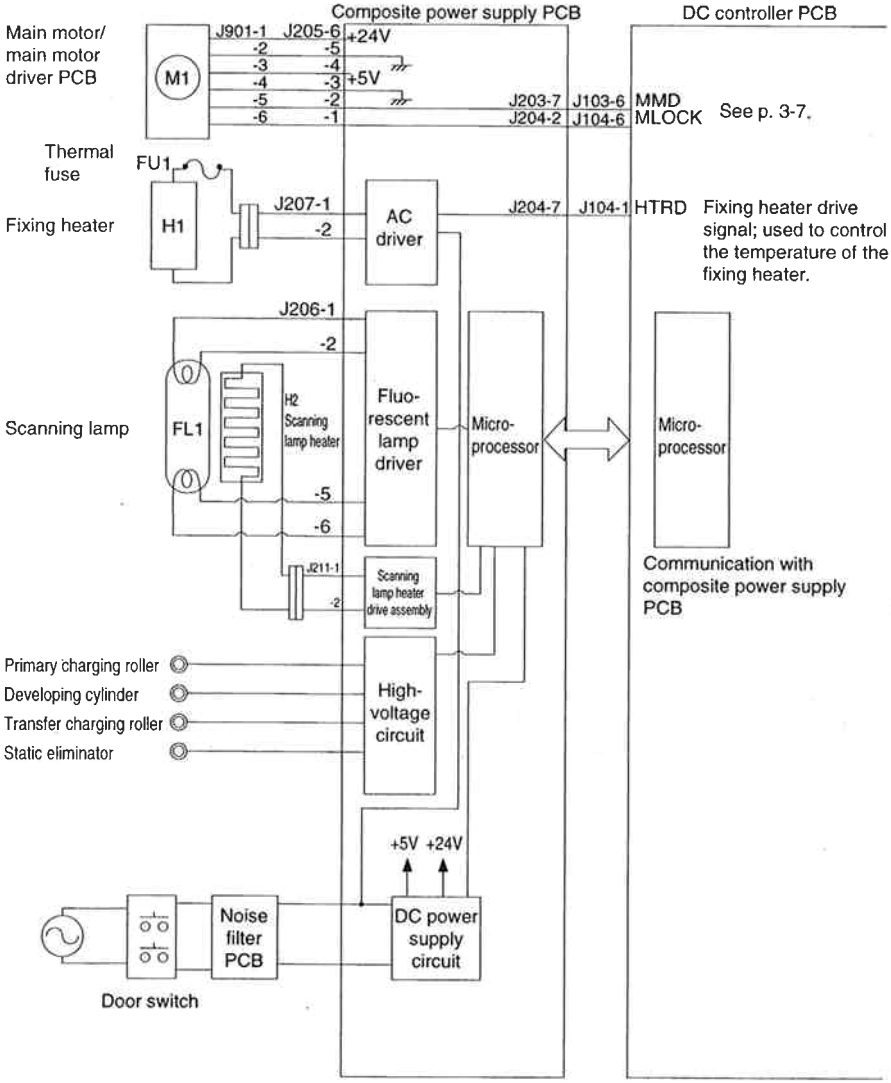

Figure 3-105

2. Outputs from the DC Controller (2/2)

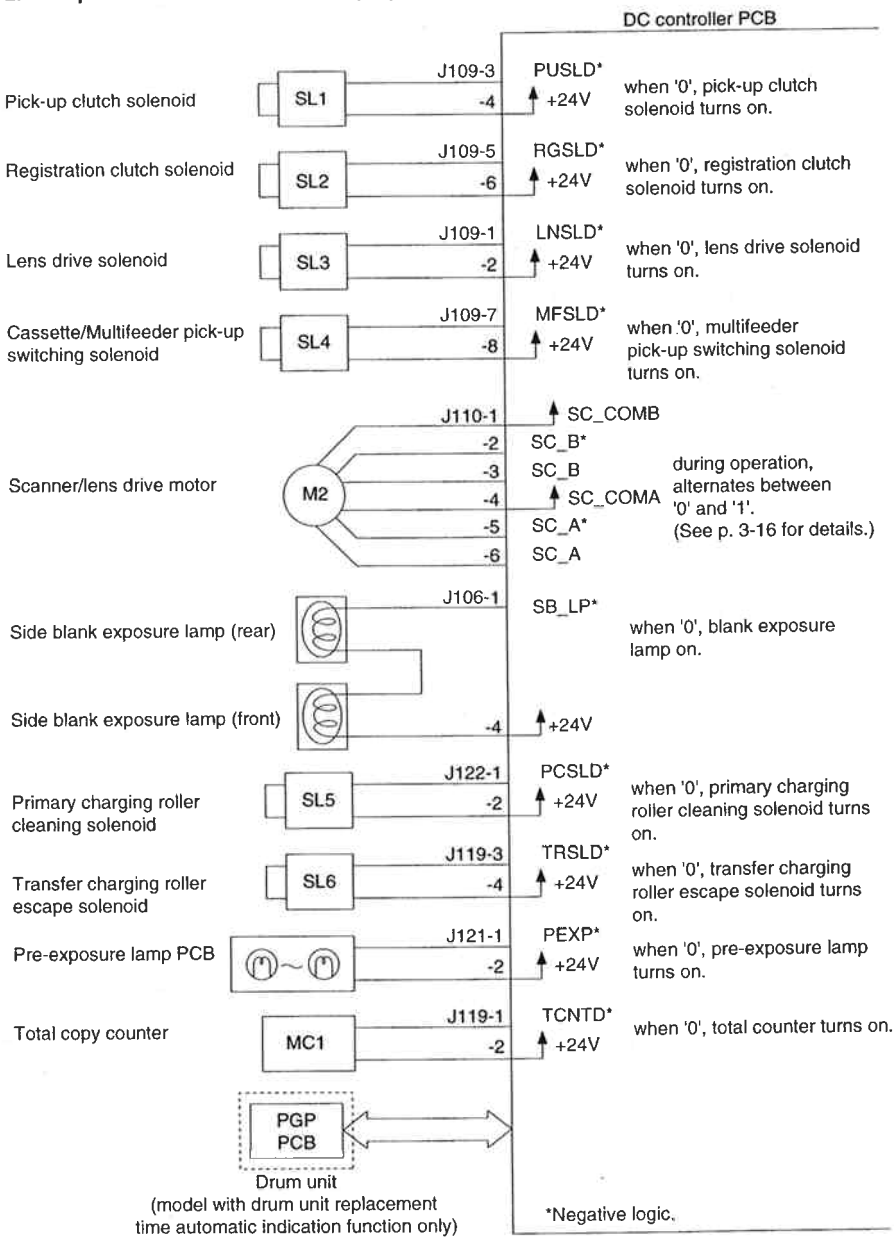

Figure 3-106

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E. Main Motor Control Circuit

1. Outline

Figure 3-107 shows the circuit that controls the main motor (M1); the circuit has the following functions:

① turns on and off the main motor.
② controls the rotation of the main motor to a specific revolution.

The main motor (M1) is a DC motor with a built-in clock pulse generator. When the motor rotates, clock pulse signals (MMCLK) are generated according to the revolution of the motor. The speed control circuit matches the phases of the frequency of these clock pulses and the frequency of the reference signal to control the rotation of the main motor (M1) to a specific revolution.

2. Operation

When the main motor drive signal (MMD) from the DC controller circuit goes '1', the drive circuit of the motor driver turns on, thereby rotating the main motor (M1) at a specific revolution.

While the main motor is rotating at a specific revolution, the main motor driver PCB sends the speed state signal (MLOCK=0) to the DC controller PCB. If, for some reason, fluctuations occur in the rotation of the main motor, the MLOCK signal goes '1'.

If MLOCK=1 continues about 1 sec while the main motor drive signal (MMD) is '1', the DC controller identifies an error in the main motor, stops the main motor and, at the same time, indicates 'E010' on the display.

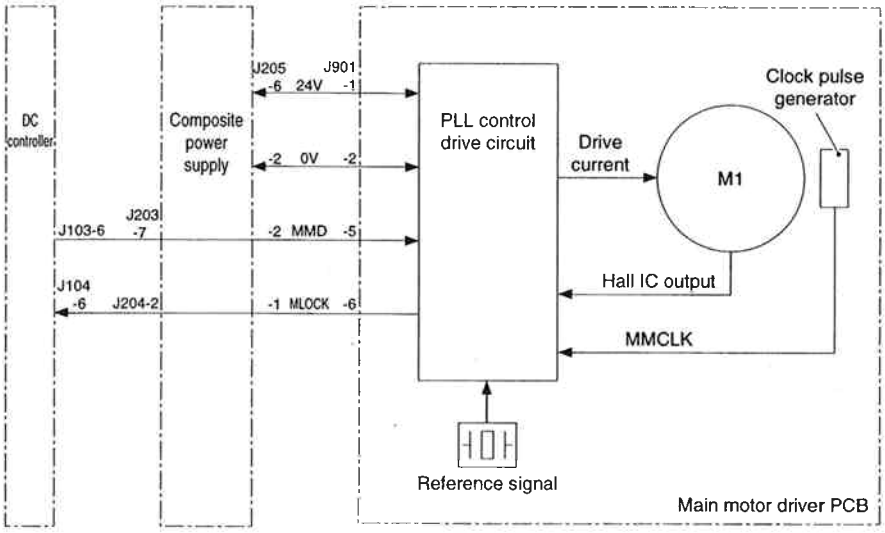
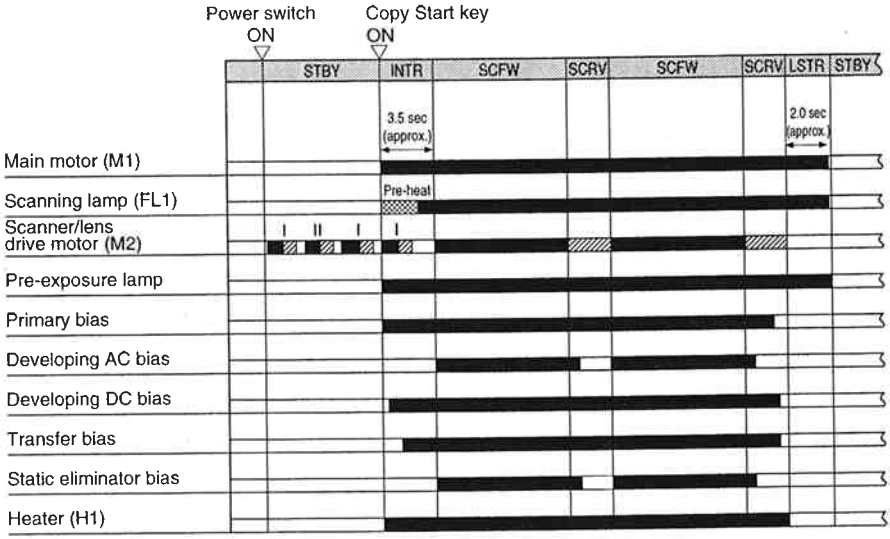


Figure 3-107

F. Basic Sequence of Operations (DIRECT, 2 copies, continuous)

1. Copy Start Key On 3.2 Sec (approx.) After Power-On



▨: reverse
I : scanner home position detection
II : lens home position detection

Figure 3-108

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2. Copy Start Key On Immediately After Power-On (less than 3.2 sec)

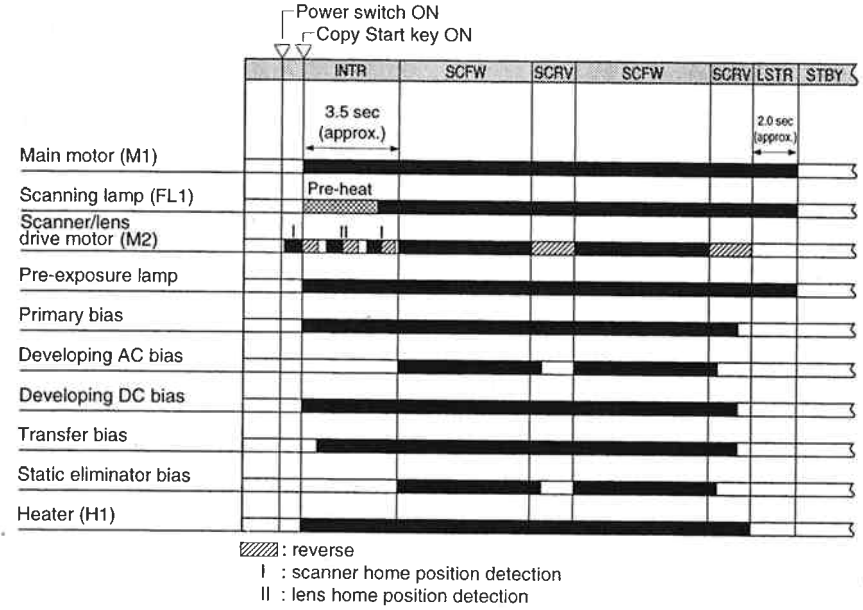

Figure 3-109

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Period		Description	Remarks
STBY (standby)	• Between when the power switch is turned on and when the Copy Start key is pressed. • Between when LSTR is over and when the Copy Start key is pressed.	Waits until the Copy Start key becomes valid.	
INTR (initial rotation)	For about 3.5 sec after the Copy Start key is pressed.	• Removes the residual charges from the photo-sensitive drum and stabilizes the sensitivity of the photo-sensitive drum in preparation for cpying operation. • Pre-heats the scanning lamp and makes preparations until the drive intensity becomes stabilized.	The pick-up signal is generated, and the first sheet of copy paper is picked up.
SCFW (scanner forward)	While the scanner is moving forward. • The distance traveled forward varies depending on the copy paper size and reproduction ratio. • The speed of forward travel varies depending on the reproduction ratio.	The scanning lamp illuminates the original, and the reflected optical image is projected on the photosensitive drum by way of mirrors and lenses.	The registration signal is generated, and the copy paper is moved to the transfer assembly.
SCRV (scanner reverse)	While the scanner is moving in reverse. • The speed of reverse travel is about 3.4 times as fast as forward travel in DIRECT.	The scanner is returned to the home position in preparation for the next copy run.	If in continuous mode, the pick-up signal is generated, and copy paper is picked up.
LSTR (last rotation)	For about 1 sec after SCRV for the last copy is over.	The last copy paper is discharged.	

Table 3-101

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II. EXPOSURE SYSTEM

A. Varying the Reproduction Ratio

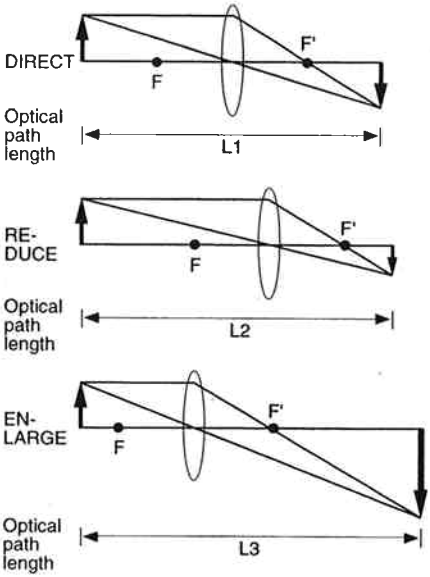
The reproduction ratio in the direction of the drum axis is varied by the lens drive system and that around the drum, by the scanner drive system.

The lens drive system holds a lens array and changes the location of the lens and the optical path length as shown in Figure 3-201 to vary the reproduction ratio in the direction of the drum axis; the length of the optical path is changed by moving the No. 4 and No. 5 mirror units as shown in Figure 3-202.

The scanner drive system changes the reproduction ratio around the drum by moving the No. 1 mirror faster (reduction) or slower (enlargement) relative to the peripheral speed of the drum.

Reference:

1. In DIRECT, the speed at which the No. 1 mirror is moved is the same as the peripheral speed of the drum.
2. The length of the optical path is longer in both REDUCE and ENLARGE than in DIRECT.



Optical path: L1< L2, L1< L3

Figure 3-201

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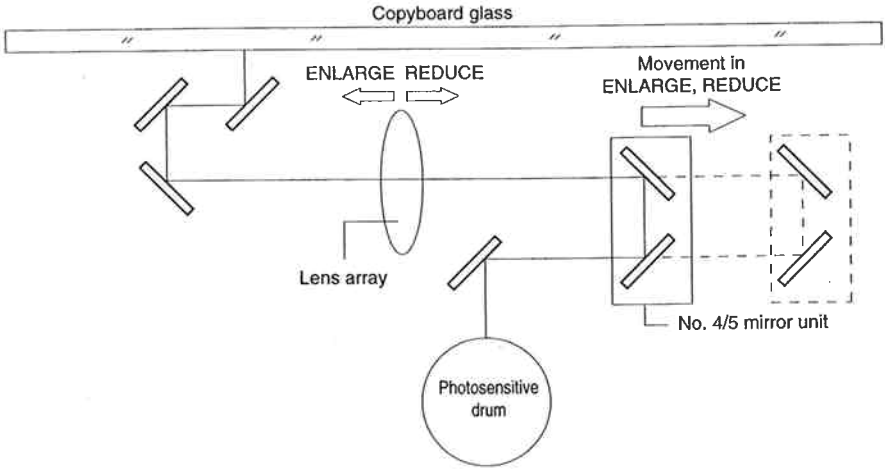

Figure 3-202

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B. Lens Drive System

1. Outline

The lens drive system is driven by the scanner motor (M2). When the lens solenoid (SL3) turns on, the switching gear is pushed in the direction of the arrow ⇨. When the scanner motor rotates in reverse (↖) in this condition, the lens unit moves in REDUCE direction by the work of gears and lens cable.

At the same time, the No. 4/5 mirror unit moves according to the travel (reproduction ratio) of the lens unit, changing the length of the optical path.

At this time, the side blank exposure lamp also moves in relation to the lens to perform black erasure at the front and the rear.

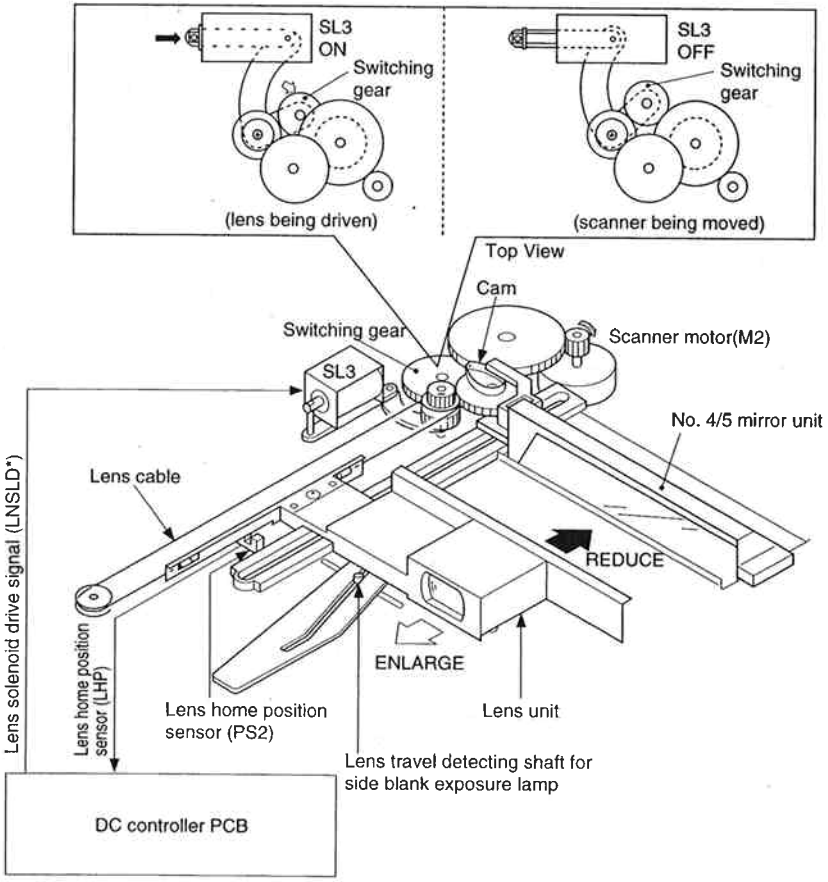

Figure 3-203

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C. Scanner Drive System

1. Outline

The scanner drive system is driven by the scanner motor (M2), which changes its direction of rotation so that the scanner moves forward or in reverse. The revolution at which the scanner is moved forward changes continuously according to the selected reproduction ratio, and the revolution at which the scanner is moved in reverse remains constant regardless of the selected reproduction ratio (about 3.4 times as fast as in forward in DIRECT).

The distance over which the scanner travels varies according to the length of copy paper and the selected reproduction ratio.

The scanner motor drives the lens drive system in addition to the scanner system.

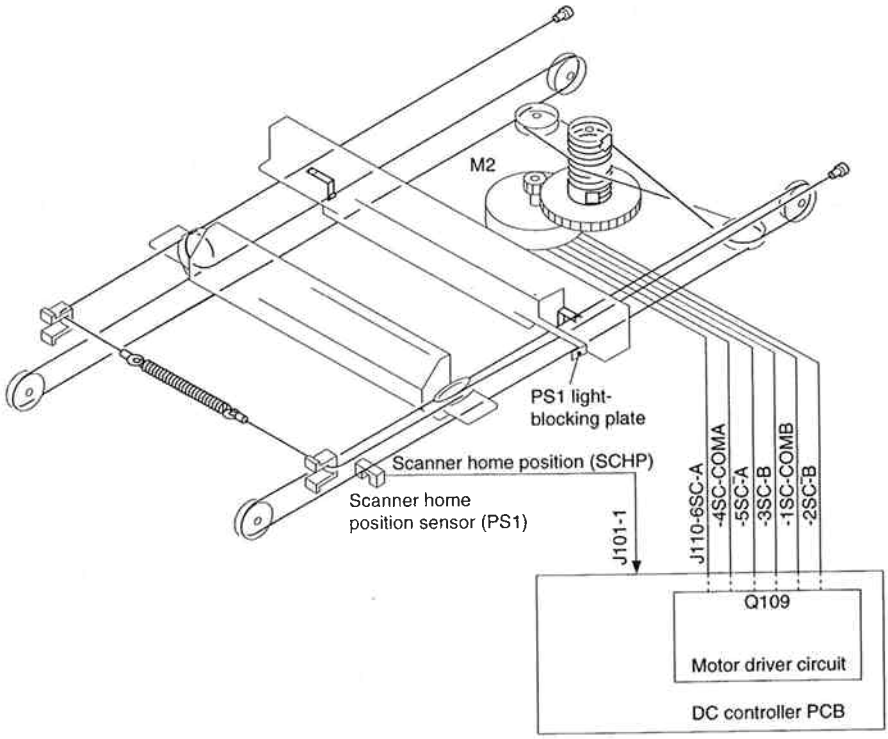

Figure 3-204

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2. Relationship between the Scanner Sensor and Signals

Scanner sensor	Signal	Scanner		Description
		Forward	Reverse	
Scanner home position sensor (PS1)	SCHP			Reference used to determine the forward travel distance.
				The scanner stops traveling in reverse in 0.1 sec.

Table 3-201

3. Basic Sequence of Scanner Operations

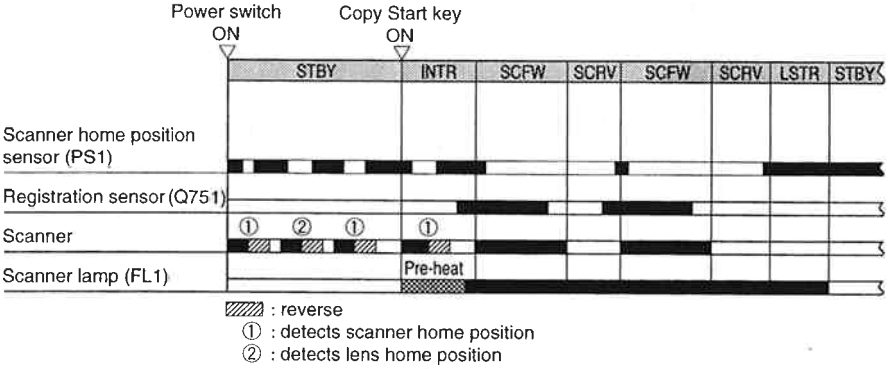

Figure 3-205

The microprocessor on the DC controller PCB controls the forward travel distance of the scanner with reference to the rising edge of the scanner home position signal. The forward travel distance varies depending on the length of copy paper* and the selected reproduction ratio in ENLARGE: if the ratio is less than 130%, the scanner is moved forward for A4 (297 mm); if the ratio is 130% or more, the scanner is moved for LTR (279 mm).

*For a discussion of how the length of copy paper is checked, see p. 3-49.

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4. Driving the Scanner/Lens Drive Motor

a. Outline

The scanner/lens drive motor (M2) is a 4-phase stepping motor. It is turned on or off and its direction and speed of rotation is changed by controlling the output timing of the drive power supply SC-COMA and SC-COMB and pulse signals A, A*, B, and B*.

b. Operation

The microprocessor (Q101) on the DC controller PCB receives such instructions as copying modes and reproduction ratios from the control panel circuit; and, in response, it sends drive pulses to the scanner motor (M2) through the motor drive circuit.

The scanner/lens drive motor is a 4-phase stepping motor, and controls the direction and speed of scanning by changing the frequency and the sequence of drive pulses (SC-A through SC-B*).

The motor drive voltage on/off switching circuit supplies power to drive the motor and removes power to stop it. The current switching circuit sets the current flowing to the motor according to the speed of rotation; the motor driver circuit is used to control the rated current according to the setting.

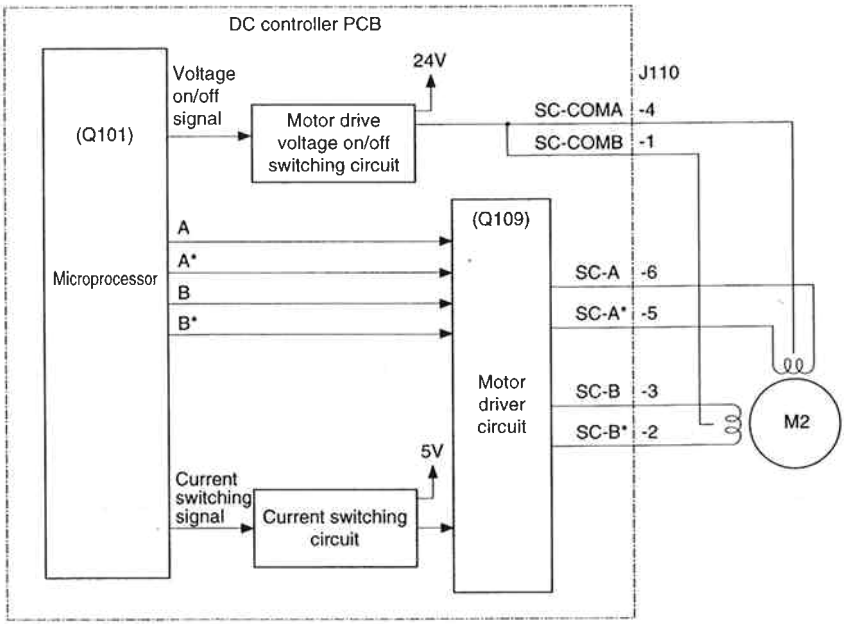

Figure 3-206

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III. IMAGE FORMATION SYSTEM

A. Outline

The copier's image formation system performs the following functions:

- controls the pre-exposure lamp.
- controls the scanning lamp.
- controls the primary/transfer corona current.
- controls the developing bias.
- measures the density of the original.
- controls side blank exposure.

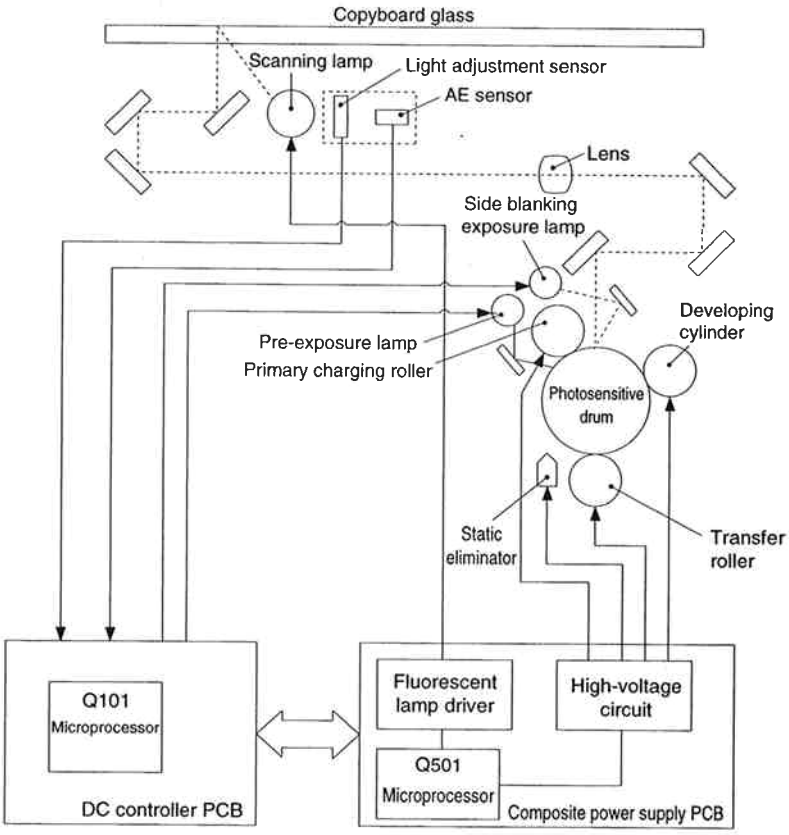

Figure 3-301

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B. Sequence of Operations (image formation system)

DIRECT, 2 Copies, Continuous

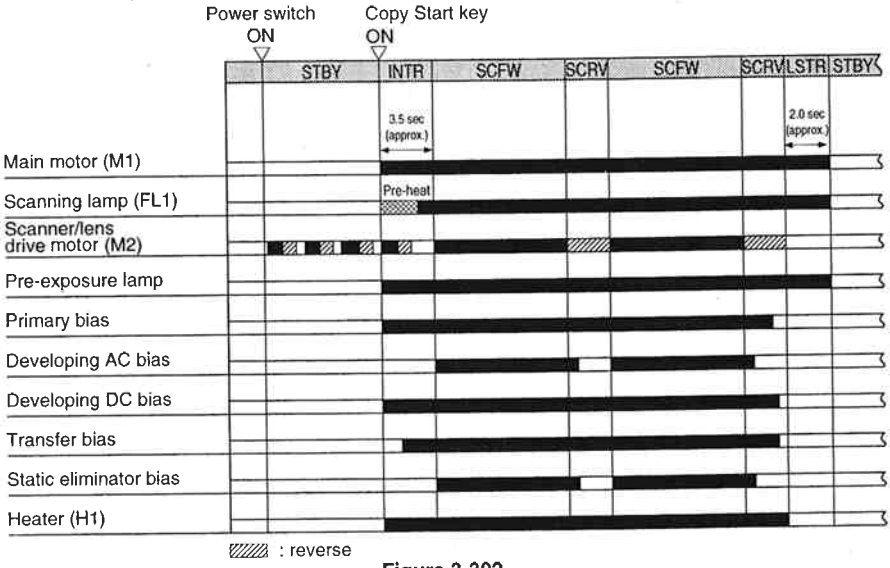

Figure 3-302

DIRECT, 2 Copies, Continuous; Copy Start key pressed immediately after power-on

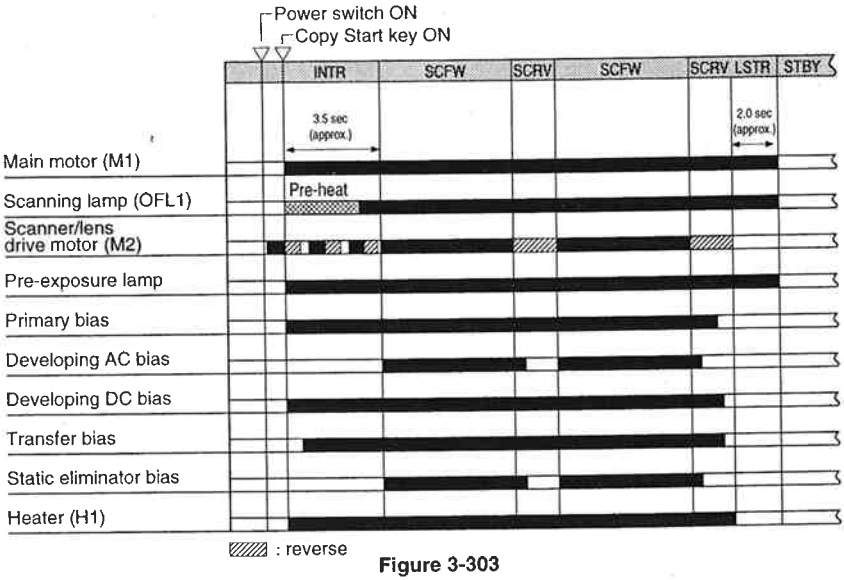

Figure 3-303

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C. Controlling the Pre-Exposure Lamp

1. Outline

The intensity of the pre-exposure lamp must remain constant at all times during APVC measurement and to ensure stable image reproduction (primary charging). To ensure stable intensity, the copier corrects variations among individual pre-exposure lamps and fluctuations in the drive voltage.

2. Operation

The PWM reference value used to determine the intensity of the pre-exposure lamp is stored in the CPU on the DC controller PCB.

The CPU on the DC controller PCB detects the voltage used to drive the pre-exposure lamp and corrects the PWM reference value so that the pre-exposure lamp may be driven at a specific intensity.

Reference:

You must enter the PWM reference value (PREX_LP) in service mode whenever you have replaced the pre-exposure lamp.

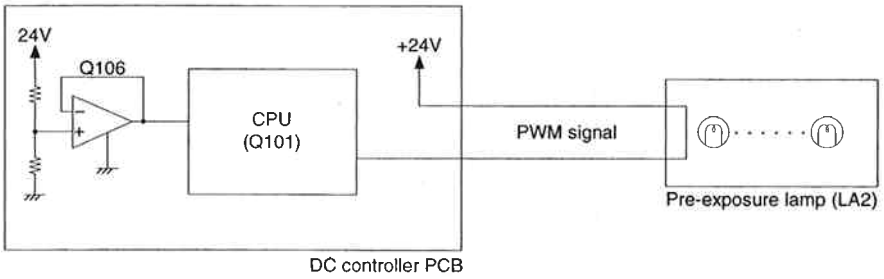

Figure 3-304

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D. Controlling the Scanning Lamp

1. Outline

Figure 3-305 shows the circuit that controls the scanning lamp (fluorescent lamp; FL1); the circuit has the following functions:

- controls pre-heating of the scanning lamp.
- turns on and off the scanning lamp.
- controls the intensity of the scanning lamp.
- automatically corrects the intensity of the scanning lamp.

The copier's scanning lamp is a fluorescent lamp.

When not controlled, the fluorescent lamp tends to be dark immediately after it is turned on, glowing brighter only gradually; moreover, its intensity does not stabilize for some time if its ambient temperature is low.

In consideration of these characteristics of the fluorescent lamp, the copier is equipped with an intensity sensor so that the originals may be illuminated only after the intensity of the fluorescent lamp has stabilized.

The copier does not start copying operation until the intensity of the fluorescent lamp has been checked and verified that it has reached a specific value.

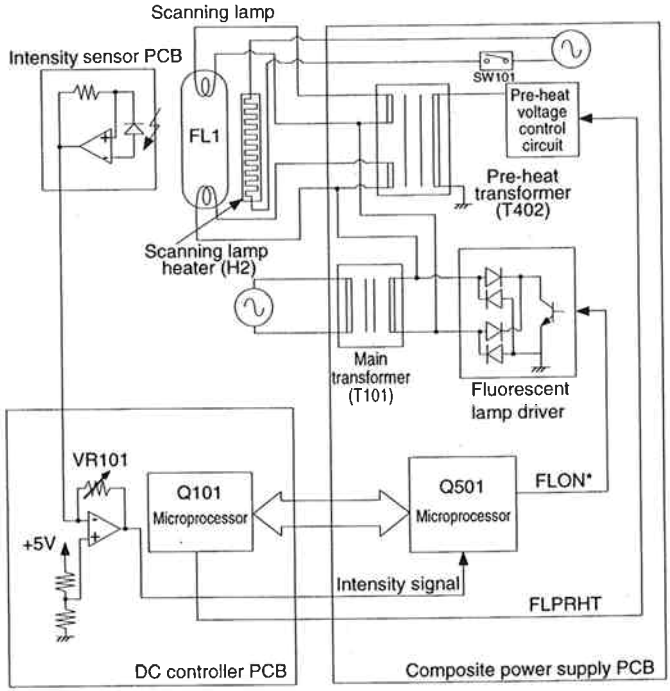

Figure 3-305

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2. Controlling the Scanning Lamp for Pre-Heating

Pre-heating is controlled for the following:

- before the scanning lamp turns on.
- while the scanning lamp remains on.

a. Controlling Pre-Heating before the Scanning Lamp Turns On

When the Copy Start key is pressed, the microprocessor (Q101) on the DC controller PCB sends the pre-heating voltage control signal (FLPRHT) to the pre-heating voltage control circuit on the composite power supply PCB. In response, the pre-heating voltage control circuit supplies 4 Vrms (effective value) to the filament of the scanning lamp.

About 3 sec later, the microprocessor on the DC controller causes the pre-heating voltage control signal (FLPRHT) to go '0', to end the pre-heating operation executed before the scanning lamp turns on.

b. Controlling Pre-Heating While the Scanning Lamp Remains On

While the scanning lamp remains on, the microprocessor (Q501) on the composite power supply PCB sends the duty ratio of the on control signal to the microprocessor (Q101) on the DC controller PCB. In response, the microprocessor (Q101) on the DC controller sends the pre-heating control signal (FLPRHT) to the pre-heating voltage control circuit to execute pre-heating control suited to the duty ratio of the on control signal for pre-heating control.

Reference:

Activation of the Fluorescent Lamp

The fluorescent lamp repeats turning on and off in specific cycles. While it is off, voltage is applied to its filament so that it will turn on smoothly, and the period during which such a voltage is being applied is called pre-heating period.

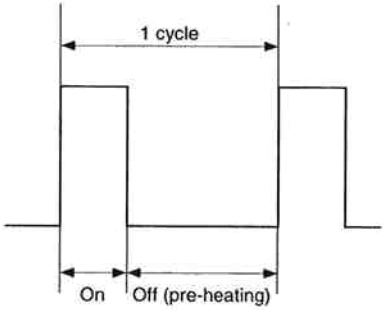

Figure 3-306

The intensity of the fluorescent lamp changes within a single cycle depending on how long the lamp remains on:

- longer on time ➡ higher intensity
- shorter on time ➡ lower intensity

The ratio of on time within a single cycle is called duty ratio, and may be expressed by the following formula:

$$\text{Duty ratio} = \frac{\text{ON time}}{\text{1 cycle}}$$

- higher duty ratio ➡ increased intensity
- lower duty ratio ➡ decreased intensity

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3. Turning On and Off the Scanning Lamp

a. Outline

When pre-activation pre-heating is over, the microprocessor (Q101) on the DC controller PCB instructs the microprocessor (Q501) on the composite power supply PCB to generate the scanning lamp on signal (FLAON*). At this time, the fluorescent lamp driver circuit operates to apply the output of the primary side of the main transformer (T102) to both ends of the scanning lamp so as to turn on the scanning lamp at a high frequency.

4. Controlling the Intensity of the Scanning Lamp

a. Outline

The intensity of the scanning lamp is controlled by the microprocessor (Q501) on the composite power supply PCB.

The intensity sensor checks the intensity of the scanning lamp and generates activation power to suit the intensity. The microprocessor, on the other hand, finds out the intensity of the scanning lamp based on the activation power to send the scanning lamp on signal (FLON*) to the on control circuit.

b. Intensity Lower Than the Specified Value

The microprocessor increases the duty ratio of the scanning lamp on signal (FLON*) sent to the fluorescent lamp driver. The fluorescent lamp driver, in turn, increases the current flowing to the scanning lamp, thereby increasing the intensity of the scanning lamp.

c. Intensity Higher Than the Specified Value

The microprocessor decreases the duty ratio of the scanning lamp on signal (FLON*) sent to the fluorescent lamp driver. The fluorescent lamp driver, in turn, decreases the current flowing to the scanning lamp, thereby decreasing the intensity of the scanning lamp.

5. Controlling (automatic) the Fluorescent Lamp Intensity (ALVC control)

The copier executes ALVC control in which the ON voltage of the scanning lamp is automatically corrected to prevent changes in the copy images caused by deterioration of the photosensitive drum.

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E. Controlling the Primary Charging Roller Bias

1. Outline

Figure 3-307 shows the circuit that controls the application voltage of the primary charging roller, and the circuit has the following functions:

- turns on and off the DC bias.
- controls the AC bias to a constant voltage.
- switches the DC bias voltage level.
- controls the scanning lamp ON voltage level.

The primary charging roller is given a DC bias so as to maintain the surface potential of the photosensitive drum to a specific value. The DC bias is switched according to whether or not a copy image is being formed.

Reference:

DC component: -900/-1376V

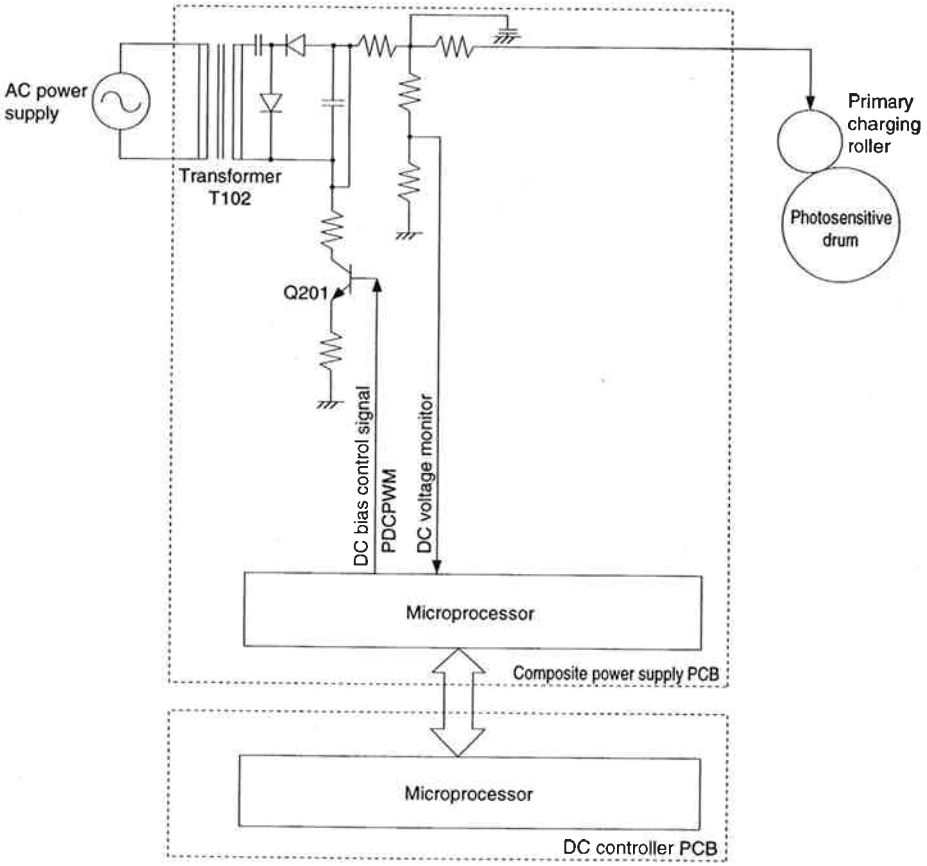

Figure 3-307

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2. Operation

a. Turning On and Off the DC Bias

When the Copy Start key is pressed, the microprocessor on the DC controller PCB instructs the microprocessor on the composite power supply PCB to turn on the DC bias.

The microprocessor on the composite power supply PCB drives the main transformer (T102).

The DC bias is generated by rectifying the voltage from the main transformer (T102) and is sent to the primary charging roller.

b. Controlling the DC Bias to a Specific Voltage

The DC bias is controlled to a specific voltage by the microprocessor on the composite power supply PCB. The microprocessor on the composite power supply PCB constantly monitors the DC voltage. The microprocessor serves to maintain the DC bias voltage to a constant value by varying the DC bias control signal (PDCPWM) based on measurements of voltage taken.

c. Switching the DC Bias Voltage Level

The copier switches the level of the DC bias voltage according to whether or not copy images are being formed.

The DC bias voltage is switched by the microprocessor on the composite power supply PCB by varying the DC bias control signal (PDCPWM) according to the DC bias switching timing signal sent by the microprocessor on the DC controller PCB.

during copying: -900 V
other: -1376 V

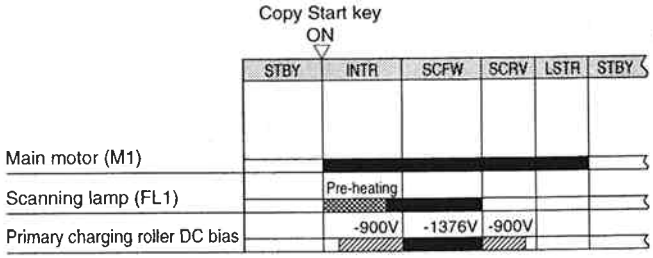

Figure 3-308

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d. Controlling (automatic) the Primary Charging roller Bias Application Voltage Level and the Scanning Lamp ON Voltage Level (APVC, ALVC control)

Copy images will suffer changes if changes occur in their static latent images, which in turn are caused by the following:

- changes in drum sensitivity; and
- changes in the degree of charge by the primary charging roller.

These symptoms are brought about by changes in the site environment (temperature, humidity) deterioration, wear, or dirt on parts.

The copier's light area potential (VL) and dark area potential (VD) have a tendency to increase; to compensate for this tendency, the copier corrects the primary charging roller bias application voltage level (APVC control) and the scanning lamp ON voltage level (ALVC control), thereby ensuring a specific light area potential (VL) and dark area potential (VD) at all times.

Study the following for an idea of how the mechanism is activated (after power-on, during initial rotation for 1st copy):

- Flow

A specific voltage of about -1,376 kV is applied to the primary charging roller for about 1.3 sec.

↓

The current value at this time is detected by the current detection circuit, and sent to the microprocessor (Q501).

↓

The microprocessor (Q501) in turn sends the current value to the microprocessor (Q101) on the DC controller so that the application voltage for the primary charging roller bias may be determined based on the value.

Caution:

You must enter the APVC value recorded on the label attached to the composite power supply circuit using service modes No. 34 and No. 35 whenever you have replaced the composite power supply PCB.

Caution:

You must enter the APVC correction voltage value recorded on the label attached to the front of the drum unit in user mode 'U7' or service modes No. 32 and No. 33 whenever you have replaced the drum unit if the model does not accommodate PGP.

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F. Controlling the Developing/ Separation Static Eliminator Bias

1. Outline

Figure 3-309 shows the circuit that controls the developing/separation static eliminator bias, and the circuit has the following functions:

- turns on and off the DC component.
- turns on and off the AC component.
- controls the voltage level of the DC bias according to type of developing assembly.
- controls the voltage level of the DC bias according to the copy density settings.

The developing cylinder is given AC and DC biases during copying operation.

While the photosensitive drum is rotating, except during development, about -500 V is applied to the developing cylinder regardless of the position of the density adjusting lever, thereby preventing adhesion of excess toner to the surface of the photosensitive drum.

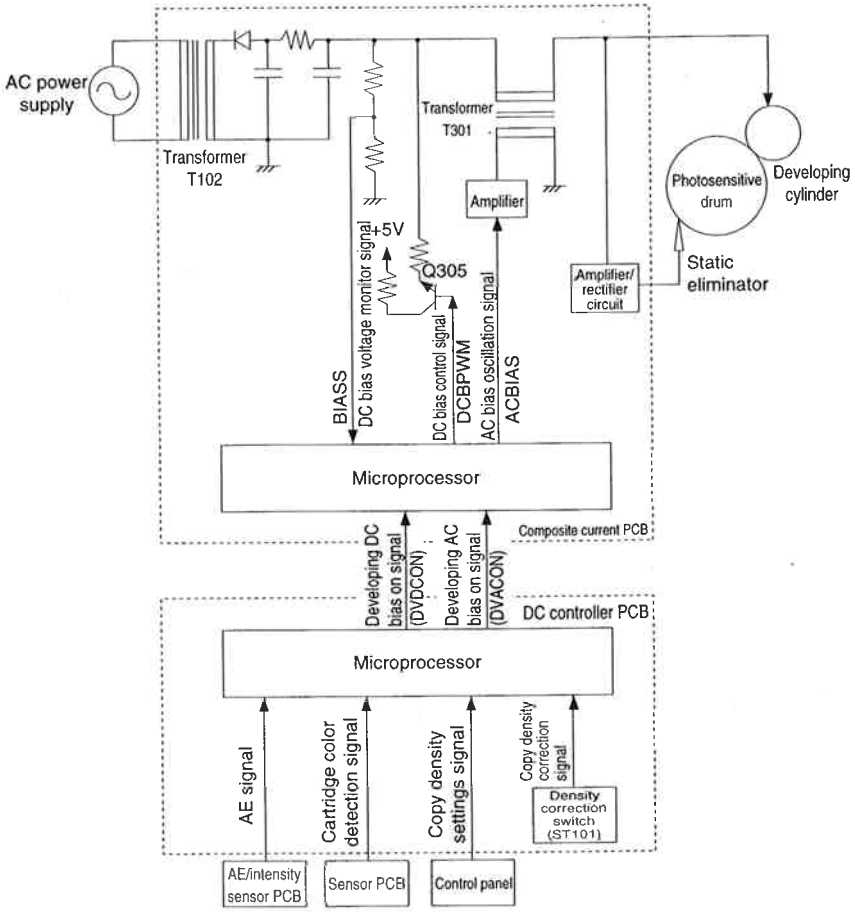

Figure 3-309

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2. Turning On and Off the DC Component

As soon as the Copy Start key is pressed, the microprocessor on the DC controller PCB sends the developing DC bias on signal (DVDCON) to the microprocessor on the composite power supply PCB.

In response, the microprocessor on the composite power supply PCB drives the main transformer (T102) to generate a DC bias for the developing cylinder.

When the developing DC bias on signal (DVDCON) from the microprocessor on the DC controller is cut, the microprocessor on the composite power supply PCB stops the drive to the main transformer (T102), thereby cutting off the DC bias.

3. Turning the AC Component On and Off

About 3.5 sec after the Copy Start key is pressed, the microprocessor on the DC controller PCB sends the developing AC bias on signal (DVACON) to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply sends the AC bias oscillation signal (ACBIAS) to the amplifier, which in turn drives the transformer (T301) and generates an AC bias for the developing cylinder.

The AC output of the transformer (T301) is transformed/rectified and then supplied to the static eliminator.

When the developing AC bias on signal (DVACON) from the microprocessor on the DC controller PCB is cut off, the microprocessor on the composite power supply PCB stops the AC bias oscillation signal (ACBIAS) to cut off the AC bias supply.

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4. Controlling the Voltage Level of the DC Bias to Suit the Copy Density Setting

The copier varies the DC bias control signal (DCBPWM) according to the settings shown below to vary the DC component voltage, thereby controlling the copy density.

- setting of the density adjusting lever (manual control mode)
- output of the AE sensor (automatic control mode)
- setting of density correction dial (VR107)
- type of developing assembly

DC bias: -50V to -550V

The density correction dial (VR107) on the DC controller PCB may be used to adjust the DC bias voltage, there by correcting foggy images caused by changes in the sensitivity of the photosensitive drum. The density correction dial functions when the density is adjusted in manual mode or during automatic density adjustment mode.

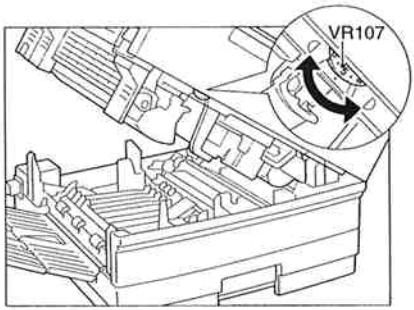
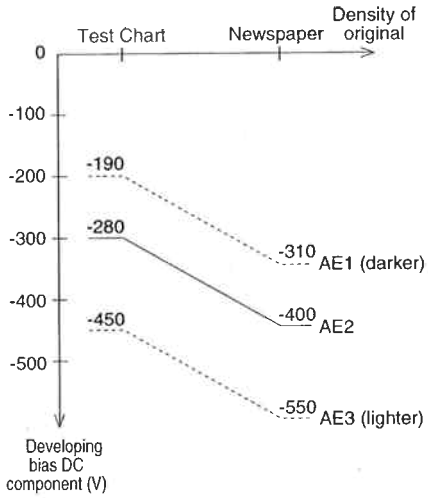


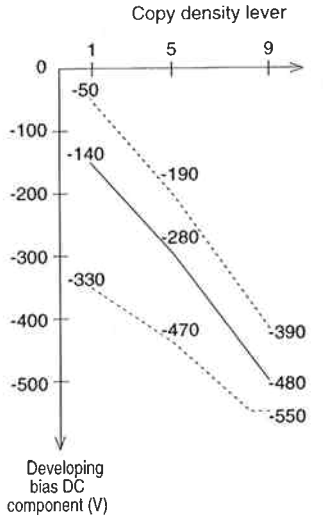
Figure 3-310

See Figures 3-311 and 312 for changes in the DC bias according to the setting of the density adjusting lever in manual mode and to the changes in the AE sensor output in automatic mode.



AE mode ON

Figure 3-311



Manual Density adjustment

Figure 3-312

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G. Developing Assembly/Cleaning Assembly

1. Outline

The developing assembly is locked or released manually by operating the locking lever.

The primary charging roller is cleaned by the cleaning pad operated by the cleaning solenoid.

The developing assembly and the waste toner feeding blade are driven by the drive of the main motor (M1) transmitted by the drive gear. The waste toner scraped by the cleaning blade is forwarded inside the drum unit by the toner feeding blade for collection.

The level of toner inside the developing assembly is monitored by the toner antenna.

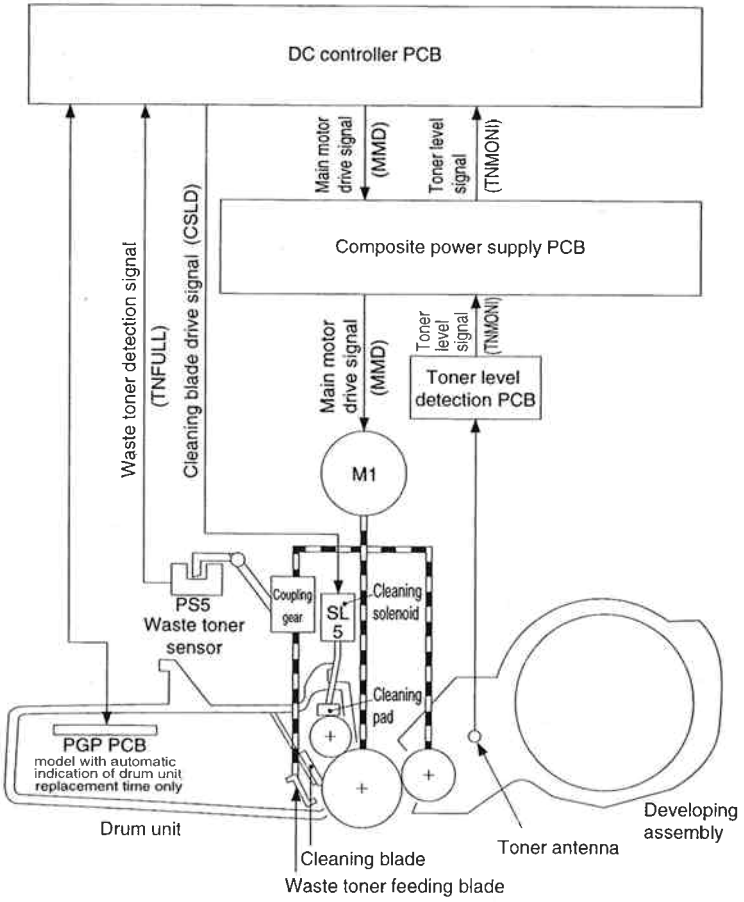

Figure 3-313

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2. Monitoring the Level of Toner

a. Outline

The level of toner inside the developing assembly is monitored by the toner level antenna and the toner level detecting circuit.

The toner level antenna is found inside the developing assembly, and an AC bias is applied to the developing cylinder so that the toner level antenna and the developing cylinder are bonded by static electricity whose size varies according to the level of toner.

The copier uses the changes in the size of this static electricity to monitor the level of toner.

b. Mechanism

The toner level detecting PCB receives an AC bias equal to the AC bias applied to the developing cylinder and an AC bias that represents the level of toner by the toner level antenna. The AC bias applied to the developing cylinder is used as a reference signal, and the AC bias from the toner level antenna is used as the toner level signal.

The toner level detection PCB compares these two types of signals and sends the results of comparison to the DC controller PCB as the toner level signal (TNMONI).

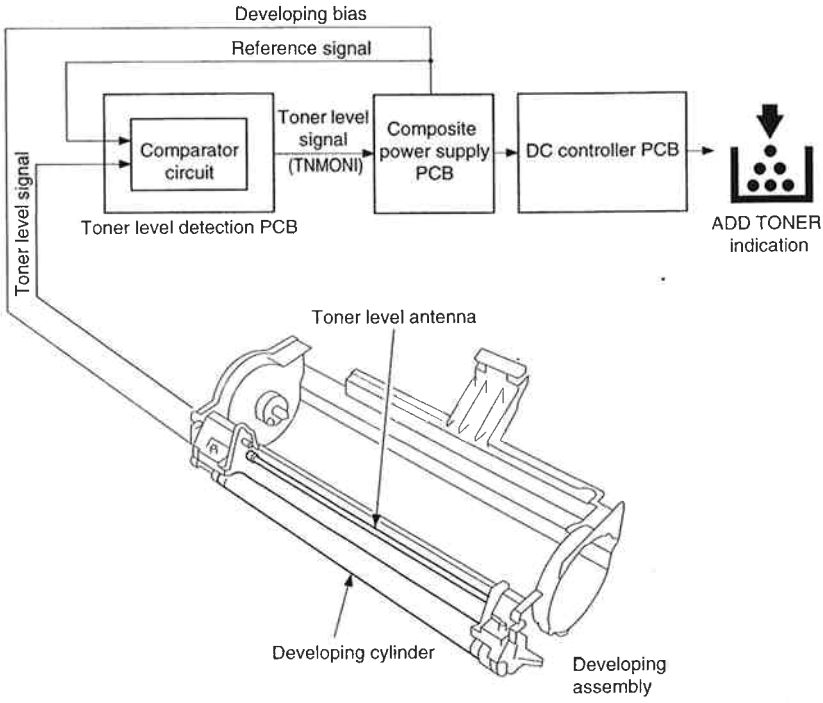

Figure 3-314

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The DC controller PCB measures the toner level signal (TNMONI) which arrives continuously at specific intervals, and takes multiple samplings for comparison against the toner level value stored in advance. If the results of comparison show that 90% or more samplings are under the toner level value, it will immediately flashes the ADD TONER indicator on the control panel and, at the same time, it will stop copying operation upon delivery of the copy; in the case of continuous copying, it stops operation after making five copies after the absence of toner has been detected.

The ADD TONER indicator turns off when you turn off and then on the power switch after the indicator has come on, enabling copying operation. However, the indicator will flash once again after a single copying operation. You can make as many as 100 copies while the ADD TONER indicator is flashing by turning off and then on the power; when 100 copies have been made, the operation will stop and remain disabled until toner is added.

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3. Cleaning the Primary Charging Roller

a. Outline

The primary charging roller remains in contact with the photosensitive drum at all times; for this reason, it can collect dirt from the photosensitive drum, possibly causing unstable primary charging.

To prevent such a problem, the copier is equipped with a cleaning mechanism for the primary charging roller, thereby ensuring stable primary charging at all times.

b. Operation

When the cleaning solenoid (SL5) turns on, the cleaning pad is butted against the primary charging roller to start cleaning.

Cleaning is executed during post rotation and lasts about 1.5 sec, making post rotation longer than rotation without cleaning.

Cleaning is executed depending on the following two conditions:

- Condition 1

Copies made since power-on are counted (cumulative), and cleaning is executed when 10 or more copies have been delivered. If the number of copies is less than 10, the copy count is stored when the power is turned off, and the new count is added to it when the power is returned.

- Condition 2

Copies made since power-on are counted, and cleaning is executed when the 20th copy has been discharged. The copy count is cleared when the power is turned off, and the copy count starts newly when the power is returned next time. When the count reaches 20 or higher, cleaning will be executed once again.

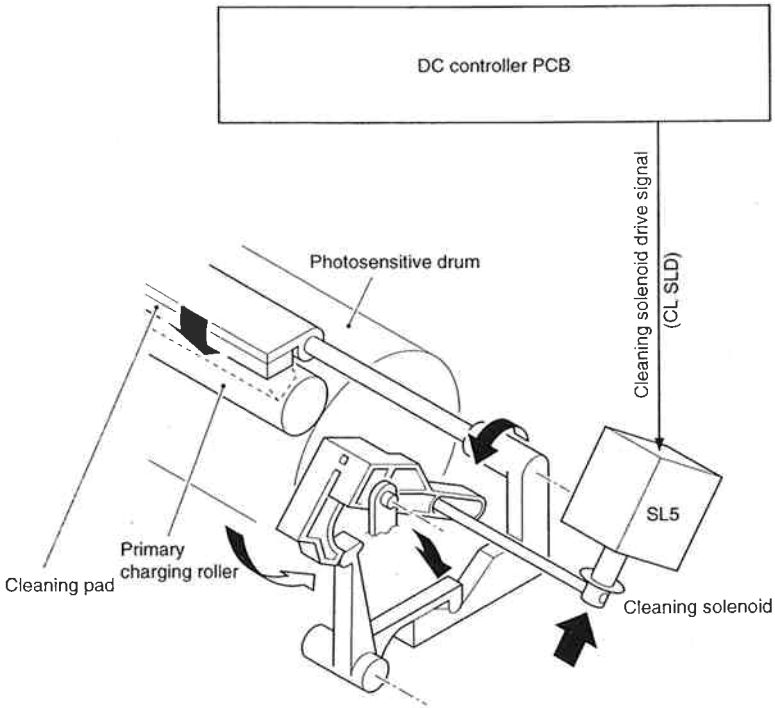

Figure 3-315

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c. Cleaning Operation Timing Chart
Condition 1

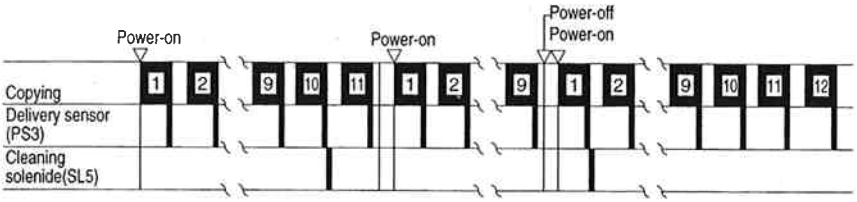

Figure 3-316

Condition 2

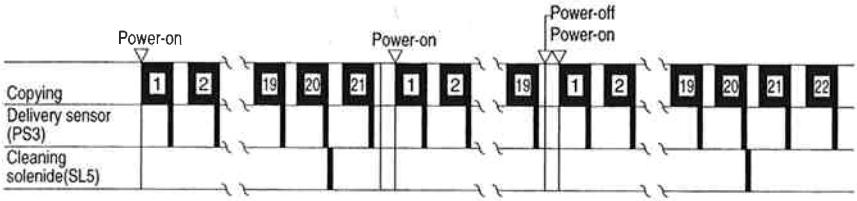

Figure 3-317

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4. Checking the Waste Toner

When the photosensitive drum rotates, its drive is transmitted through the drum gear, coupling gear, and toner feeding blade drive gear in order. The toner feeding blade serves to forward waste toner collected by the cleaning blade to the inside of the drum unit.

The coupling gear transmits drive by keeping two gears in contact by the work of a spring.

When the inside of the drum unit becomes full of waste toner, the load against rotating the toner feeding blade increases. Further, when torque is imposed on the toner feeding blade, the coupling gear becomes disengaged, cutting the drive to the toner feeding blade, thereby causing the flag to move away from the waste toner sensor (PS5). When the flag leaves the waste toner sensor, the Replace Drum Cartridge indicator (⊙⊃) on the control panel starts to flash; in the case of a model with the drum unit replacement automatic indication function, the indicator turns on.

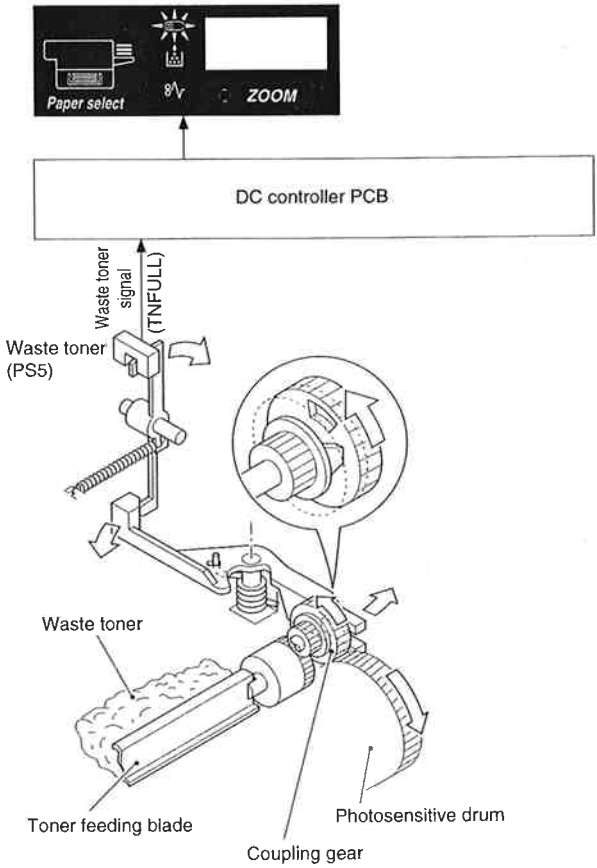

Figure 3-318

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5. Drum Unit Replacement Time Automatic Indication Mechanism*

*Only for a model with the drum unit replacement time automatic indication function.

a. Outline

This mechanism is used to indicate when the drum unit must be replaced based on the number of copies made. A PGP PCB is provided inside the drum unit to inform the DC controller when the drum unit must be replaced.

When the time for the replacement of the drum unit approaches, the DC controller PCB flashes the Replace Drum Unit indicator on the control panel; when the time for the replacement comes, the DC controller turns on the Replace Drum Unit indicator on the control panel, and indicates 'CC' (Change Cartridge) on the copy/count indicator after making 100 copies.

The copy may have a drum unit which accommodates this function or one which is not designed so. In addition, if you install a drum unit which does not accommodate the function in a copier model which is designed for the function, copying operation will be suspended while 'CC' (Change Cartridge) is indicated on the count/ratio indicator.

b. Operation

• Drum Unit Installed

When the drum unit is installed and the power is turned on, the DC controller reads the following four types of data from the PGP PCB and stores them:

1 serial number of drum unit (recorded on PGP PCB)
2 copy count
3 primary charging voltage (DC) correction value
4 drum sensitivity current correction value

If the DC controller PCB cannot find a serial number or finds a serial number which does not belong to the copier, it turns on the Replace Drum Unit on the control panel and suspends copying operation while indicating 'CC' on the count/ratio indicator.

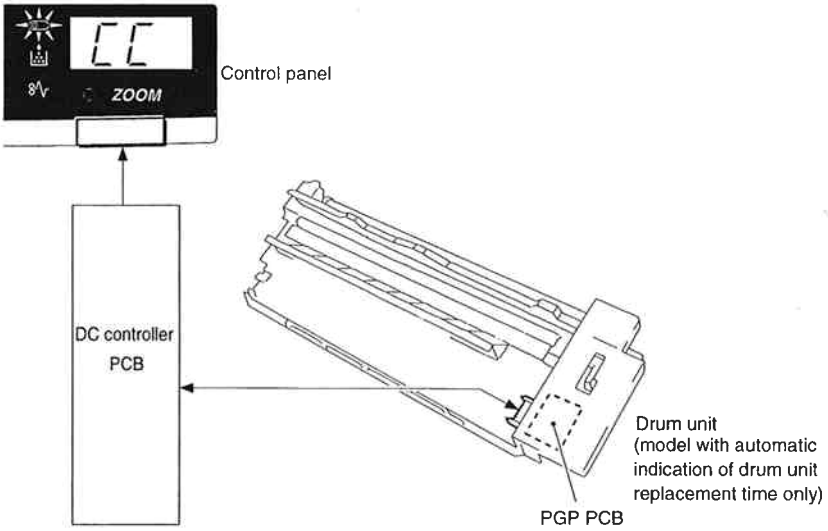

Figure 3-319

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• During Copying Operation

The DC controller advances the copy counter on the PGP PCB each time a copy is delivered. When the count reaches 29,000, it flashes the Replace Drum Unit indicator on the control panel to inform the user that the time for replacement is approaching.

When the count reaches 30,000, the DC controller turns on the Replace Drum Unit on the control panel to inform the user that the time for replacement is approaching. You may make a further 100 copies after the indication has turned on, and you can check the current count in service mode.

When the copy count reaches 30,100, the DC controller turns on the Replace Drum Unit on the control panel and suspends copying operation while indicating 'CC' on the count/ratio indicator. (In continuous copying, the operation is suspended after making all the copies.)

To reset the copier when its operation has been suspended, replace the drum unit with a new one.

Copy count	Replace Drum Unit indicator (⊂⊃)	Count/ratio indicator	Copying	Description	Remarks
29,000	Flashing	Indicates count/ratio	Yes	Indicates that the drum unit must soon be replaced.	• You may turn off the indication in user mode.
30,000	ON	Indicates count/ratio	Yes	Indicates that the copier will soon stop operating. It will stop operating after making an additional 100 copies.	• You can check the current copy count in user mode.
30,100	ON	Indicates 'CC'	No	Indicates that the drum unit must be replaced.	• You cannot make copies unless you replace the drum unit.

Table 3-301

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H. Controlling the Transfer Roller Bias

1. Outline

The copier uses a direct transfer method with a roller. For this reason, it controls the bias differently from the conventional copiers that employ corona charging.

The transfer roller bias may be either of the following three types; see the descriptions for the function and output timing of each:

a. Transfer Bias

This bias corresponds to the transfer bias of a conventional copier, and is a negative voltage.

b. Cleaning Bias

The copier uses a direct charging method, and could allow adhesion of toner to the transfer roller moving from the photosensitive drum because of a jam.

To remove such toner, the copier applies a positive voltage at a specific timing to return the toner from the transfer roller to the photosensitive drum.

- during initial rotation after the Copy Start key is pressed.
- while the scanner is moving in reverse.
- during last rotation.

c. Reference Bias (ATVC)

Changes in the environment or deterioration of the transfer roller can change the resistance of the transfer roller, ultimately affecting the transfer efficiency.

To suppress the changes in the copy images caused by changes in the transfer efficiency, the copier corrects the level of transfer bias application.

The transfer ATVC bias is a bias applied each time the Copy Start key is pressed to determine the correction value.

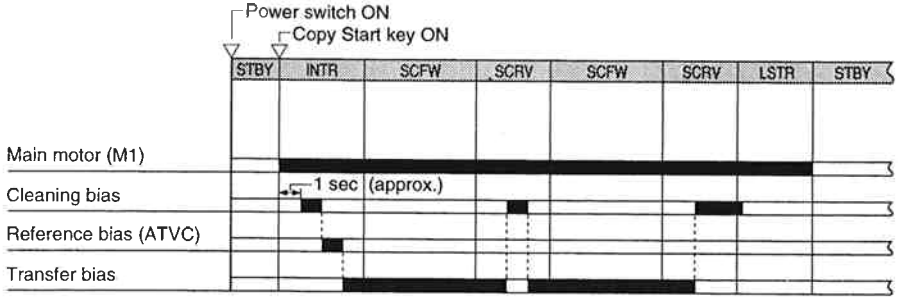

Figure 3-320

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Figure 3-321 shows the circuit that controls the foregoing three types of bias, and the circuit has the following functions:

- turns on and off the transfer roller bias.
- controls the transfer bias to a constant voltage.
- corrects the voltage level of the transfer bias (ATVC)
- switches the polarity of the DC bias (cleaning).

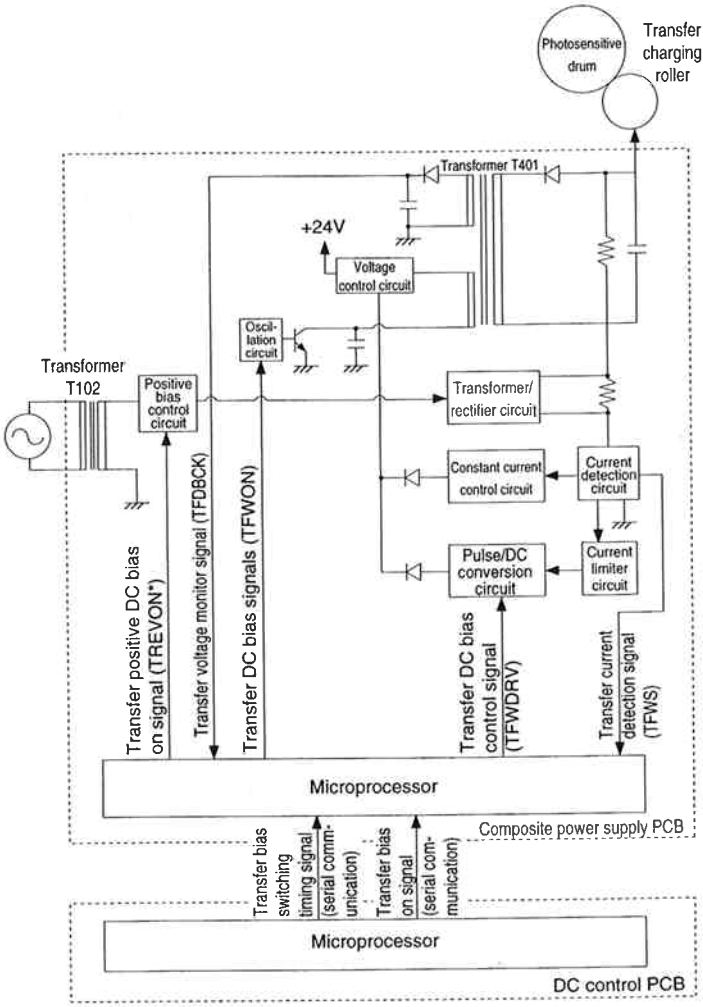

Figure 3-321

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2. Turning On and Off the Transfer Roller Bias

The microprocessor on the DC controller PCB sends the transfer bias on signal to the microprocessor on the composite power supply PCB. In response, the microprocessor on the composite power supply generates the transfer bias on signal to drive the transformer (T401), thereby supplying the transfer charging roller with transfer bias.

3. Controlling the Transfer Bias to a Specific Voltage

The transfer bias is controlled to a specific voltage by the microprocessor on the composite power supply PCB. The microprocessor on the composite power supply PCB monitors the voltage of the transfer bias at all times. The microprocessor on the composite power supply PCB sends the transfer bias control signal through the pulse/DC conversion circuit according to the detected voltage to the voltage control circuit to maintain the transfer bias to a specific voltage.

4. Correcting the Voltage Level of the Transfer Bias

The copier corrects the voltage level of the transfer bias in any of the following two ways:

- before starting copying (ATVC)
- after starting copying

a. Before Starting Copying (ATVC)

To correct changes in the transfer efficiency caused by changes in the environment or deterioration of the transfer roller, the copier automatically corrects the application voltage level of the transfer bias.

During initial rotation after the Copy Start key is pressed, the copier feeds a specific current to the transfer roller. The current detection circuit on the composite power supply PCB sends measurements of the current to the microprocessor in the form of the current detection signal. The microprocessor determines the voltage to be applied to the transfer roller based on such data.

This control is executed once during initial rotation after a press on the Copy Start key.

b. After Starting Copying

The copier automatically corrects the application voltage during copying operation to compensate for the changes in the transfer efficiency caused by different types of copy paper.

The current detection circuit detects the current flowing through the transfer charging roller and sends the data to the microprocessor on the composite power supply PCB. Using the data, the microprocessor determines the voltage to be applied to the transfer charging roller and controls the DC bias voltage by generating the transfer DC bias control signal so that the voltage will be optimum.

5. Switching the Polarity of the DC Bias (cleaning)

The microprocessor on the DC controller PCB sends the transfer bias switching timing signal to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply PCB, on the other hand, turns off the transfer DC bias on signal and, at the same time, sends the transfer positive DC bias on signal to the positive bias control circuit. The voltage from the positive bias control circuit is sent to the transfer charging roller through the transformer/rectifier circuit.

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I. Measuring the Density of the Original (AE)

1. Outline

The copier is equipped with an automatic density adjustment (AE) mechanism which adjusts the DC component of the developing bias. As long as the original has an even overall density, the AE mechanism ensures the generation of copies without fogging by varying the DC component of the developing bias to suit the density of the original.

The copier's AE mechanism does not execute an AE scan; rather, it measures the density of the original during initial rotation at the scanner home position; for this reason, the copying speed remains the same in both AE and non-AE modes.

Figure 3-322 shows the circuit that controls the measurement of the density of originals.

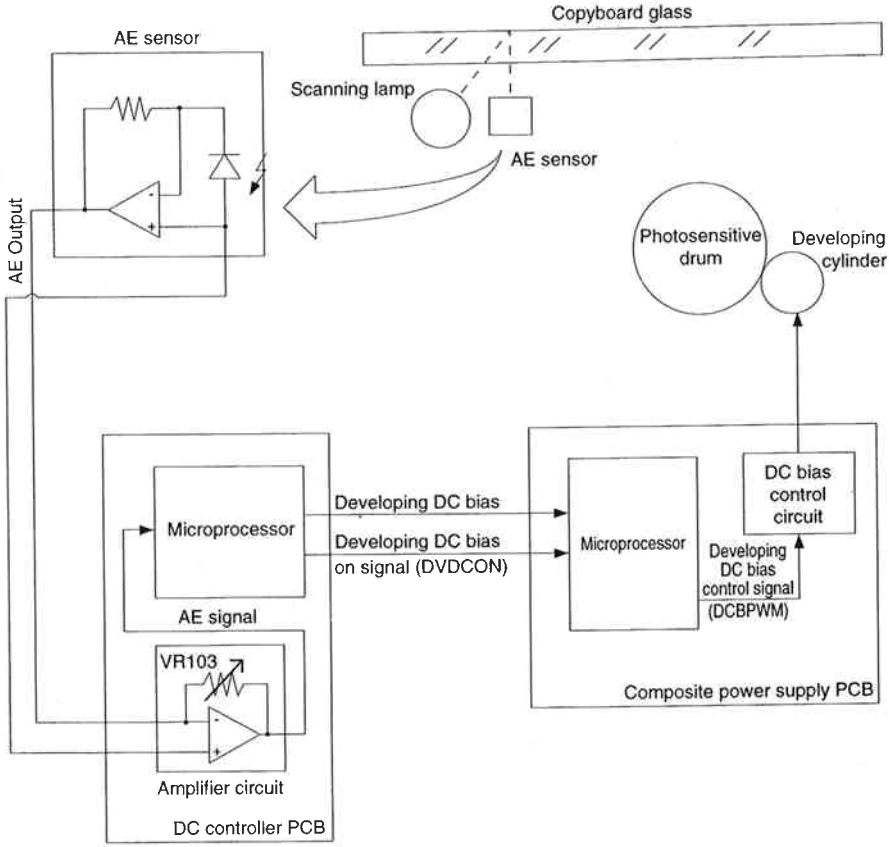

Figure 3-322

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2. Operation

To measure the density of an original, the scanning lamp is turned on at a specific intensity to expose the original during initial rotation with the scanner at the home position.

The light reflected by the area shown in Figure 3-323 is checked by the AE sensor (photodiode), whose output is amplified and sent to the microprocessor on the DC controller PCB as the AE signal.

The microprocessor on the DC controller PCB checks the AE signal four times, and averages the measurements to compute the developing DC bias which best matches the averaged density of the original; it then sends the developing DC bias signal and the developing DC bias on signal to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply PCB generates the developing DC bias control signal (DCBPWM) based on the value of the DC bias.

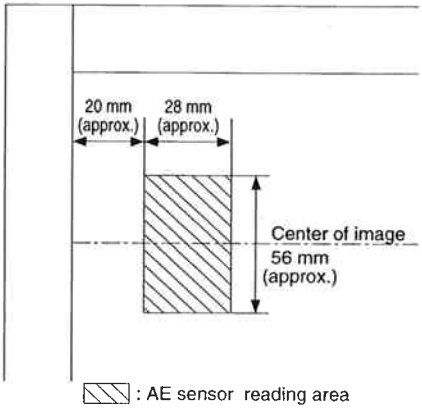

Figure 3-323

3. Basic Sequence of Operations (AE measurement)

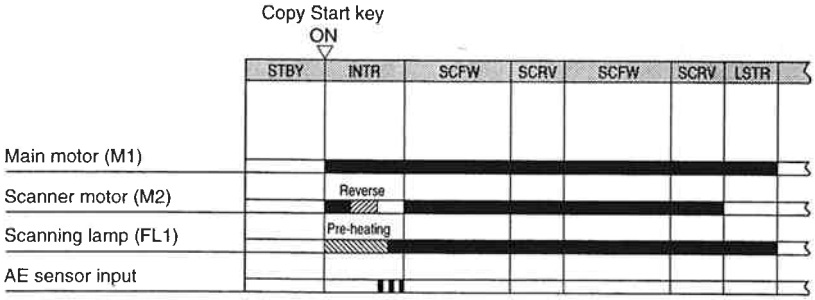

Figure 3-324

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4. AE Adjustment (VR102, VR103)

Make the following adjustments whenever you have replaced the scanning lamp or the intensity/AE sensor PCB:

Preparing for Adjustment

- Obtain a newspaper whose print is as even as possible; avoid one with photos or with large headings.
- Make sure you have adjusted the intensity of the scanning lamp.

1) Turn on the copier.
2) Short the two jumper wires (JP3, JP4) on the DC controller PCB using a screwdriver.
   - 'F' appears on the ratio/count indicator.

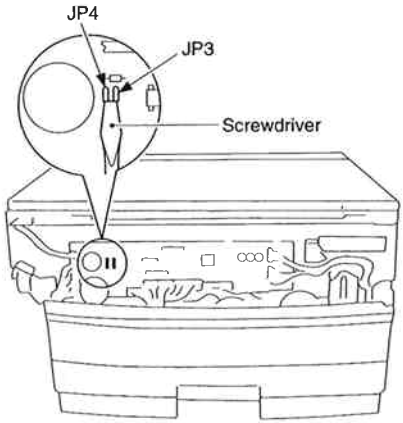

Figure 3-325

3) Stop shorting the jumper wires; press the +/- key so that '40' appears on the ratio/count indicater; than, press the start key.
   - The scanning lamp should turn on, and the main motor (M1) should rotate.

4) Turn VR103 on the DC controller PCB fully clockwise.

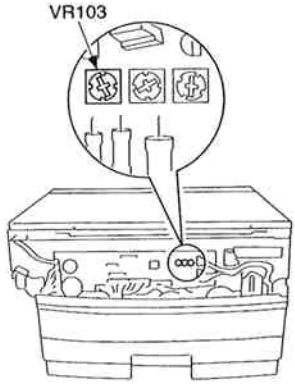

Figure 3-326

5) Place a newspaper on the copyboard, and close the copyboard cover.
6) Turn VR102 so that the reading in the display is between b2 and bc.

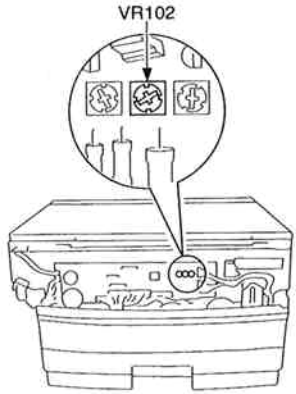

Figure 3-327

7) Remove the newspaper from the copyboard, and place a stack of five sheets of copy paper on the copyboard glass instead; then, close the copyboard cover.

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8) Turn VR103 on the DC controller PCB so that the reading in the display of the control panel is between 53 and 5d.

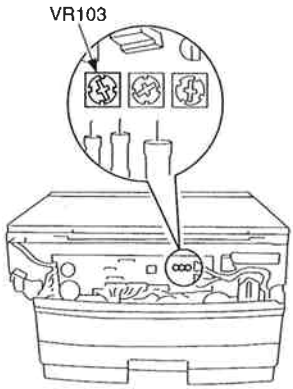

Figure 3-328

9) Make one copy, and check if it is free of fogging but the print is dark enough.
   - If fogging is noted or the characters are too light, repeat the steps starting with step 1) once again.
   - If the problem cannot be corrected after going through the steps once again, use the density correction dial (VR107).

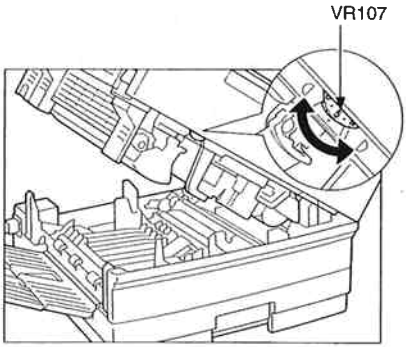

Figure 3-329

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J. Controlling the Side Blank Exposure

1. Outline

The copier is equipped with a side blank exposure lamp at the front and the rear to prevent adhesion of toner to the drum when reduced copies are made.

2. Operation

The side blank exposure lamp moves based on the travel distance of the lens as measured by the lens travel detecting shaft for reduced copies for blanking out the non-image areas.

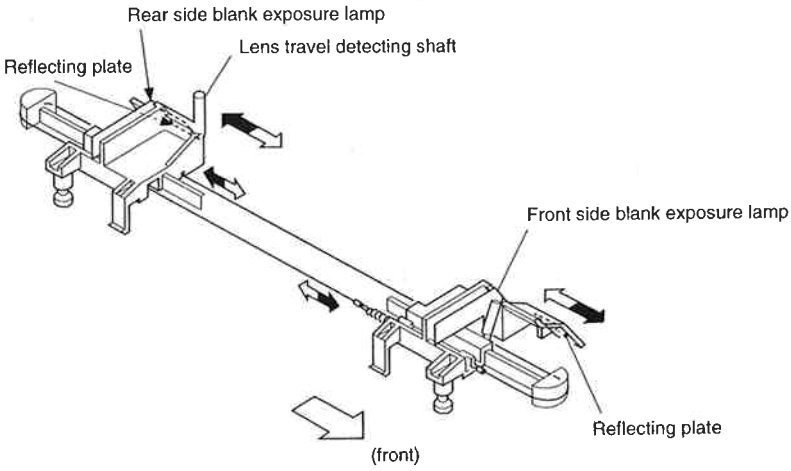
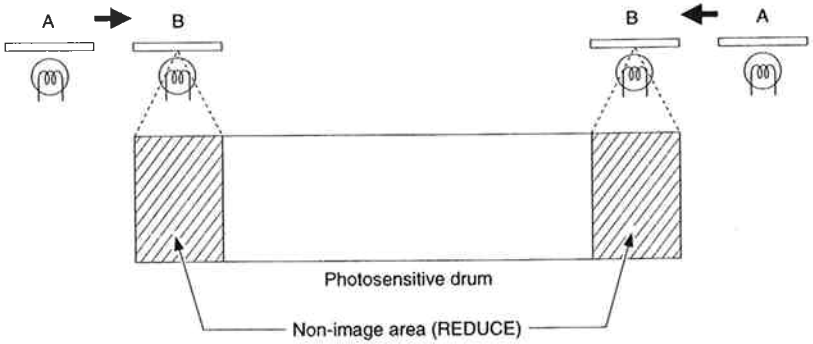


Figure 3-330



A : position of the side blank exposure lamp at time of DIRECT/ENLARGE.
B : position of the side blank exposure lamp at time of REDUCE.

Figure 3-331

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IV. PICK-UP/FEEDING SYSTEM

A. Outline

The copier uses center reference feeding, in which copy paper is moved while centered along the pick-up/feeding path; the pick-up system consists of a single-cassette path or a multifeeder path.

Copy paper from the cassette or the multifeeder is controlled by the registration roller so that it matches the leading edge of the image on the photosensitive drum; it is then moved to the transfer, separation, feeding, and fixing assemblies before it is discharged to the copy tray.

The copier is equipped with two sensors to monitor the movement of copy paper.

No.	Name	Remarks
PS3	Delivery paper sensor	
Q751	Pre-registration roller paper sensor	

Table 3-401

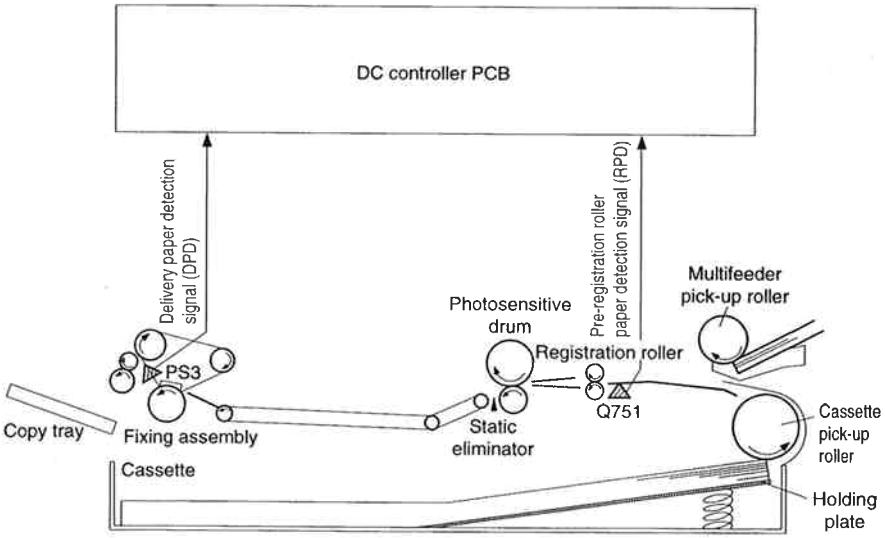

Figure 3-401

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B. Controlling the Pick-Up Roller

1. Outline

The copier has two pick-up rollers; namely, the cassette pick-up roller and the multifeeder pick-up roller. The drive to the rollers is switched by a gear unit that shifts the drive path; for this reason, the drive is transmitted to only one of the two rollers at a time.

2. Controlling the Cassette Pick-Up Roller

The cassette pick-up roller is controlled by the spring clutch, control ring, and pick-up solenoid (SL1).

When the solenoid turns on, the pawl moves away from the control ring, thereby allowing the drive of the main motor (M1) to be transmitted to the pick-up roller.

When the pick-up roller starts to rotate, copy paper is picked up and sent as far as the registration roller. The registration roller, in turn, serves to control the copy paper so that it matches the leading edge of the image on the photosensitive drum.

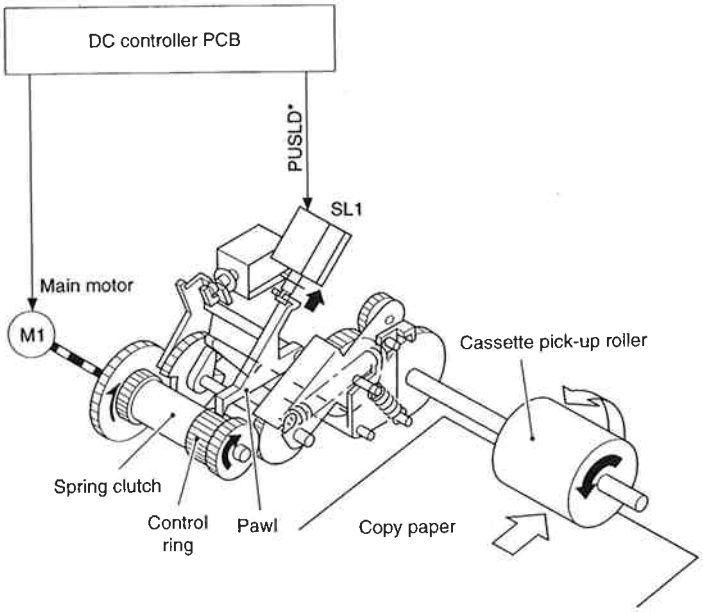

Figure 3-402

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3. Controlling the Multifeeder Pick-Up Roller

The multifeeder pick-up roller is controlled by the spring clutch, control ring, pick-up solenoid (SL1), gear unit, lift arm, and multifeeder pick-up solenoid (SL4).

When the multifeeder pick-up solenoid (SL4) turns on, the drive of the main motor (M1) is transmitted to the cam gear. When the cam gear starts to rotate, the lifter which is in contact with the cam gear starts to lift the gear unit and, at the same time, lowers the paper guide plate. The cam gear is designed to stop at a specific location.

When the solenoid (SL1) turns on while the mechanism is in this spatial relationship, the pawl moves away from the control ring, allowing the drive of the main motor (M1) to be transmitted to the multifeeder pick-up roller.

When the multifeeder pick-up roller rotates, copy paper is picked up and sent as far as the registration roller. The registration roller in turn controls the copy paper so that its leading edge matches the leading edge of the image on the photosensitive drum.

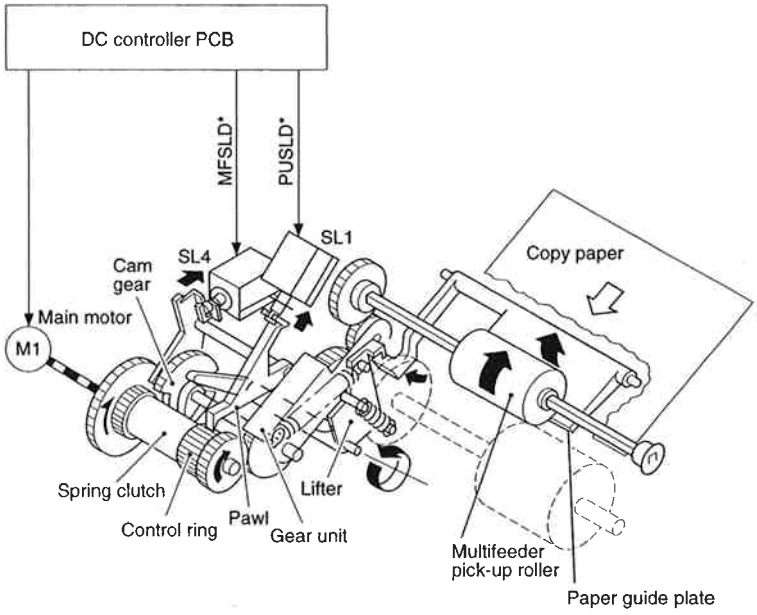

Figure 3-403

C. Controlling the Feeding Mechanism

1. Controlling the Registration Roller

The registration roller is controlled by the spring clutch, control ring, registration sensor, and registration solenoid (SL2).

When the microprocessor on the DC controller PCB receives the pre-registration paper detection signal from the pre-registration paper sensor (Q751), it turns on the registration solenoid at a specific timing. When the registration solenoid turns on, the pawl moves away from the control ring, allowing the drive of the main motor to be transmitted to the registration roller and moving the copy paper to the photosensitive drum.

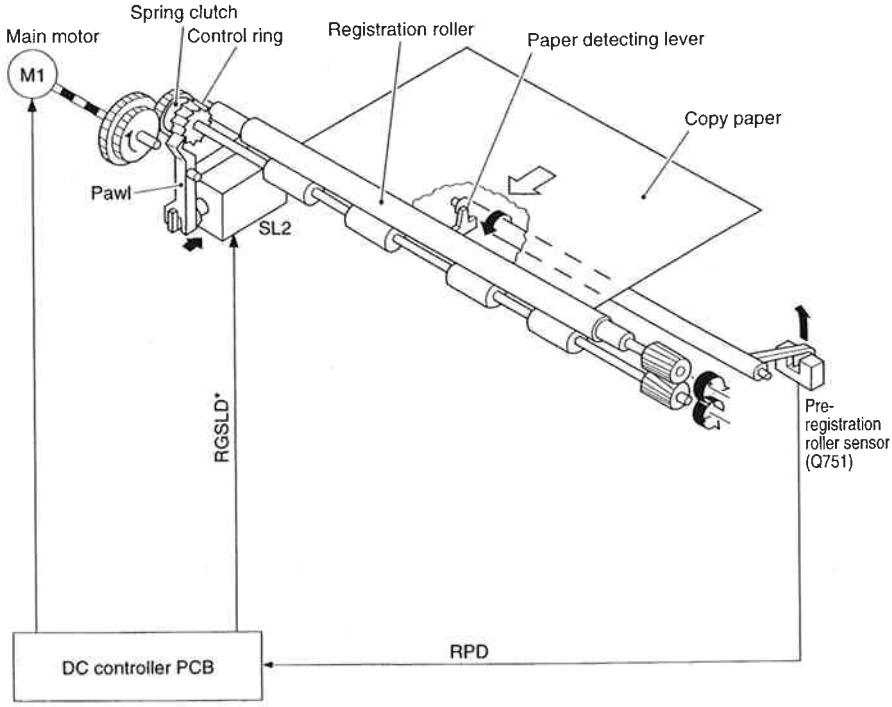

Figure 3-404

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2. Basic Sequence of Operations (pick-up/feeding; A4, 2 copies)

a. Pick-Up from the Cassette

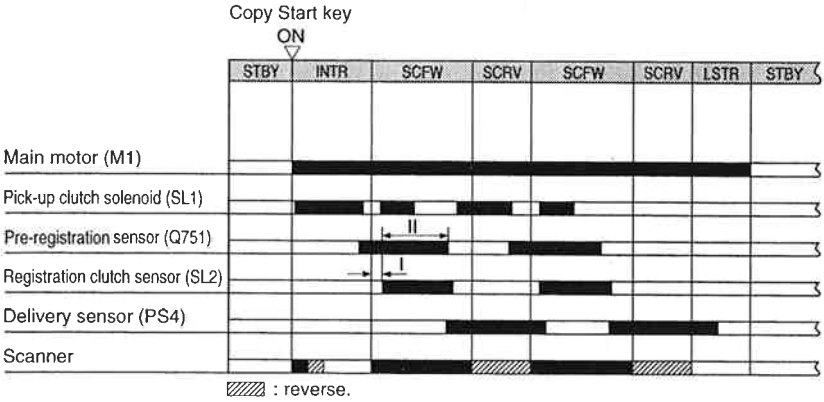
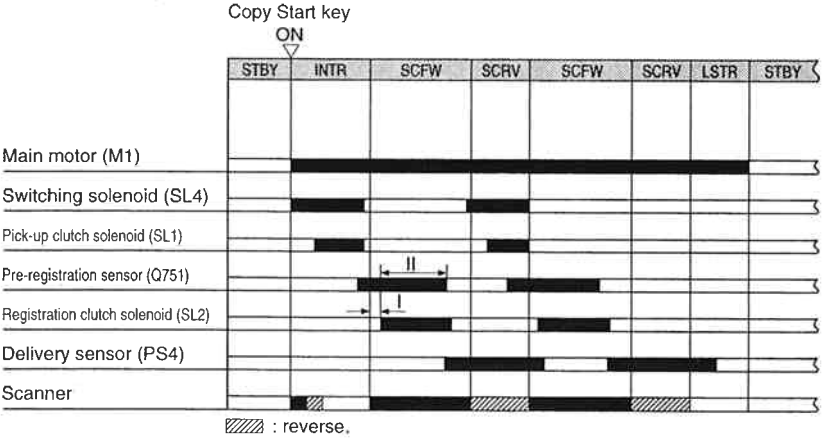


Figure 3-405

b. Pick-Up from the Multifeeder



I : Varied by value under '30' of service mode (registration adjustment).
II : Used for measuring the length of copy paper.
length of copy paper (mm) = 92 (mm/s) x II (s) + 11 (mm) - 10 (mm)
92 (mm/s): speed at which copy paper is moved.
11 (mm): distance between pre-registration sensor and registration roller.
10 (mm): length of actuator of the pre-registration sensor.

Figure 3-406

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D. Fixing and Delivery

1. Outline

The drive roller of the fixing assembly is driven by the main motor (M1).

The rotation of the drive roller turns the fixing film, ultimately rotating the lower fixing roller.

The temperature of the fixing heater is monitored by the thermistor (TH1), and is communicated to the microprocessor on the DC controller PCB as the fixing heater temperature signal (TH1).

Based on the value of the TH1 signal, the microprocessor on the DC controller PCB changes the fixing heater drive signal (HTRD) to control the temperature of the fixing heater.

The rear end of the fixing heater is equipped with a sub thermistor (TH2) to check for overheating.

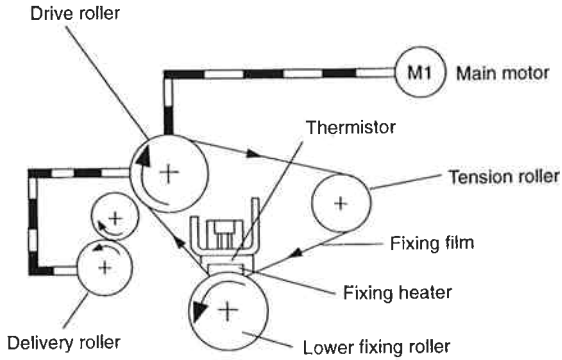

Figure 3-407

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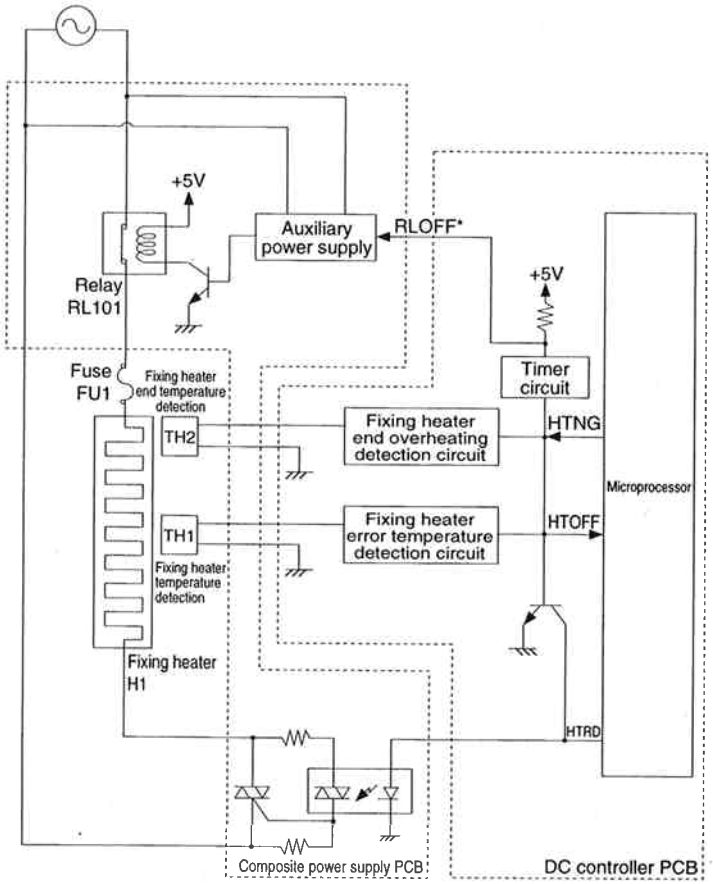

Figure 3-408

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2. Controlling the Temperature of the Fixing Heater

The copier keeps the fixing heater off while in standby state, and starts supplying the fixing heater with power when the Copy Start key is pressed.

The control temperature for the fixing heater is determined in response to the first press on the Copy Start key after power-on. The control temperature for the fixing heater is determined by the temperature of the fixing heater (value of main thermistor TH1) and the number of copies to be made in continuous mode. The control temperature of the fixing heater is determined by any of the following three ways.

The copier keeps track of the number of copies made until the power is turned off or the auto shutoff mechanism (about 5 min) is activated, during which time the effective control temperature will not be changed.

	Heater temperature at first press on Copy Start key after power-on	Copies	Control temperature
1	Lower than 100°C	1 to 9	215°C
		10 to 14	210°C
		15 to 19	205°C
		20 to 24	200°C
		25 to 29	195°C
		30 or more	190°C
2	100°C or higher and less than 120°C	1 to 9	205°C
		10 to 14	200°C
		15 to 19	195°C
		20 or more	190°C
3	120°C or higher	1 to 9	195°C
		10 or more	190°C

Table 3-402

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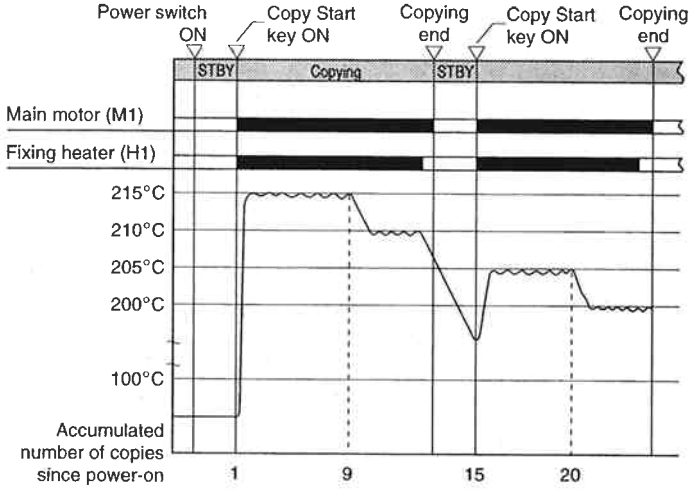

Figure 3-409

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3. Controlling the Power Supply to the Fixing Heater

The temperature of the fixing heater is controlled by controlling the power supplied to the fixing heater.

The power to the fixing heater is controlled by controlling its phase.

The microprocessor on the DC controller PCB controls the output timing of the fixing heater driver signal (HTRD) so that power suited to the target temperature of the fixing heater may be supplied; this is to control the phase of the power supplied to the fixing heater.

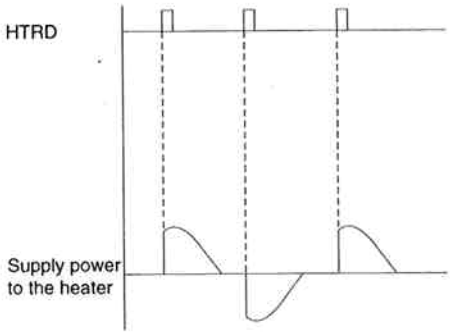

Figure 3-410

4. Correcting the Variation in the Resistance of the Fixing Heater

The plane-shaped heater used as the fixing heater has production variations in its resistance that would hinder proper execution of thermal control of the fixing heater.

To correct possible problems, the copier compensates for the variations in terms of seven settings of the resistance, whose values are read by a microprocessor.

Caution:

The resistance of the fixing heater is decided based on the combination of the jumper wires connected to the connector of the thermistor (TH1); see Figure 3-411.
The resistance is checked and appropriate settings are made at the factory when the fixing assembly is assembled; do not rearrange the jumper wires.

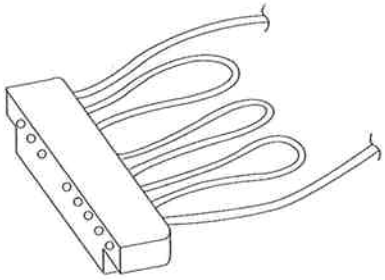

Figure 3-411

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5. Checking for Overheating at the End of the Fixing Heater

The rear end of the copier's fixing heater is equipped with a sub thermistor (TH2) to check for overheating.

The thermistor serves to prevent damage to the fixing film otherwise caused by overcurrent occurring in areas where paper does not come into contact while copies are made continuously on paper of A4 or smaller.

In multifeeder manual mode, the copier increases the paper-to-paper distance as soon as the number of copies made in continuous mode reaches a specific value indicated in the following table, i.e., changes the copy speed from 12 cpm to 8 cpm:

Heater temperature at copy start	Number of copies made in continuous mode
less than 100°C	30th copy
100°C or more to less than 120°C	20th copy
120°C or more	10th copy

Table 3-403

By increasing the gap between sheets, the copier decreases the power supplied to the fixing heater, thereby preventing overheating at ends.

Once changed, the distance between sheets of paper is maintained until copying is over.

Should the temperature at the end of the fixing heater still keep rising after increasing the distance between sheets and the sub thermistor (TH2) detects 255°C or more, copying operation is stopped after discharging the ongoing copy; at the same time, 'H' is indicated in the display of the control panel, disabling the Copy Start key.

The 'H' indication turns off automatically when the detection temperature of the sub thermistor (TH2) falls below 240°C, and a press on the Copy Start key then will make the remaining number of copies.

Caution:

If overheating is detected at ends, the copier indicates 'H' on the control panel; advise the user that the indication does not refer to an error.

6. Protection Mechanisms

The copier is equipped with the following protection mechanisms to prevent malfunction of the fixing heater:

a. Thermistor (TH1, TH2)

The microprocessor on the DC controller PCB monitors the voltage of the thermistor (TH1, TH2); if it detects a high temperature error or a low temperature error, it sends the fixing heater error signal (HTNG) to the timer circuit and, at the same time, indicates an error code (E000 through E003) on the control panel. In response, the timer circuit sends the relay off signal (RLOFF*) to the auxiliary power supply about 1.5 after it has received the fixing heater error signal (HTNG). The auxiliary power supply in turn turns off the relay (RL601) to turn off the power supply. The data for problems associated with 'E000 through E003', i.e., related to the heater, is backed up and 'E000 through E003' will be indicated on the control panel next time the power is turned on.

When the power is turned off while 'E000' through 'E003' is indicated on the control panel, 'E000 through E003' will be indicated on the control panel if the power switch is turned on, and the Copy Start key will not be enabled.

b. Thermal Fuse (FU1)

If the area around the thermal fuse exceeds 226°C and remains so for a specific period of time, the thermal fuse melts to cut off the power to the fixing heater.

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7. Correcting Displacement of the Fixing Film

a. Outline

The fixing film can become displaced toward the front or the rear as it keeps moving. To correct such displacement, the copier is equipped with a correction mechanism.

The fixing film displacement correction mechanism consists of the following four parts:

- tension roller
- swing arm
- tension wire
- balance spring

Displacement, if any, of the fixing film is corrected by moving the front side of the tension roller up and down by the balance spring and the wire. When the fixing film has become displaced toward the front, the copier lowers the front of the tension roller; when the fixing film has become displaced toward the rear, the copier moves up the front of the tension roller.

The tension roller is designed to stop where the fixing film can move without displacement by the work of the balance spring and the wire.

If the fixing film becomes displaced toward the rear or the front in excess of the range within which displacement is corrected, the fixing film displacement sensor (PS4) turns on. When the sensor (PS4) turns on, the fixing film is stopped and an error code (E0 and 07 alternately flashed) is indicated on the control panel.

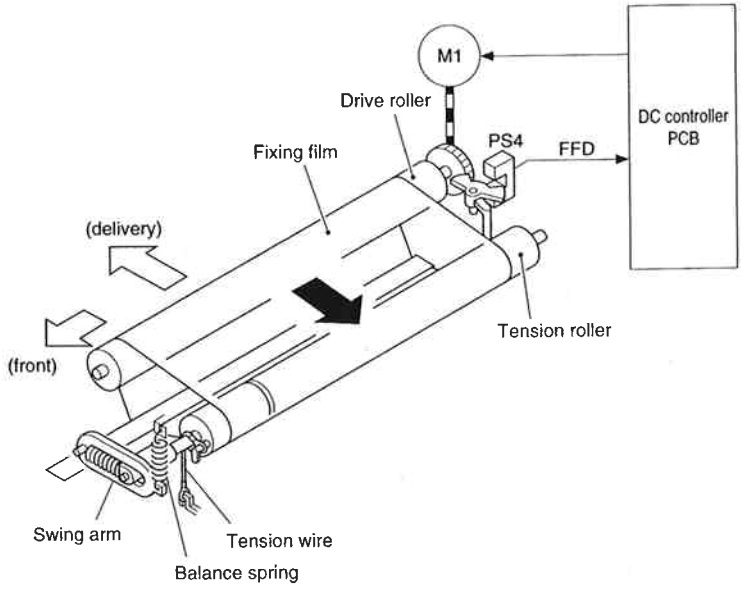

Figure 3-412

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b. Operation

The tension roller consists of an idler roller and a friction roller. The idler roller rotates in relation to the movement of the fixing film; and the friction roller, which is along the same axis as the idler roller, rotates independently of the idler roller. A tension wire is hooked on the peripheral direction of the friction roller shaft, taking in the tension wire for a length corresponding to the rotation force of the friction roller so as to lower the front of the tension roller.

The tension of the tension wire increases or decreases in proportion to the rotation force of the fiction roller. The rotation force of the friction roller increases or decreases in proportion to the area of the fixing film that comes in contact with the friction roller.

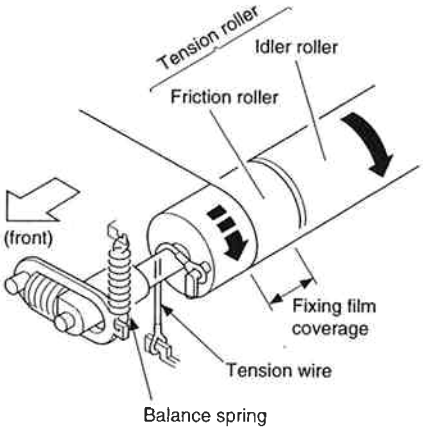

Figure 3-413

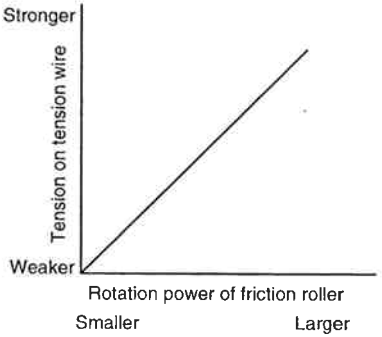

Figure 3-414

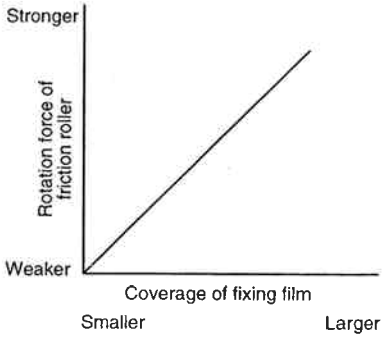

Figure 3-415

When the fixing film becomes displaced toward the rear, the area of the fixing film coming into contact with the fixing film will decrease, thereby decreasing the rotation force of the fixing roller. When the rotation force of the friction roller decreases, the tension of the tension wire decreases, thereby causing the balance spring to lift the front of the tension roller by way of the swing arm.

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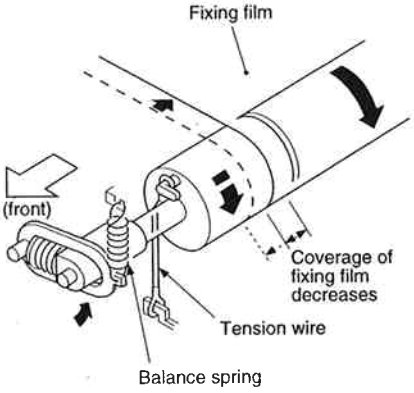

Figure 3-416

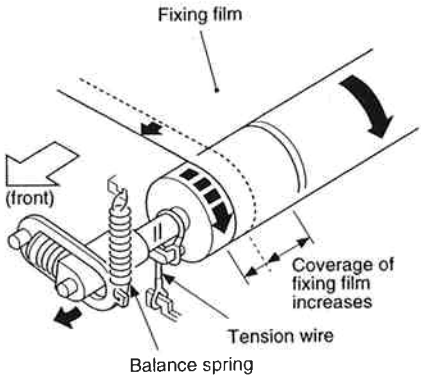

Figure 3-417

The front of the fixing film starts to move toward the front when the front of the tension roller is raised.

As the fixing film moves toward the front, the coverage of the friction roller by the fixing film will become greater to increase the rotation force of the friction roller; the condition will cause the tension wire to move down the front of the tension roller.

As the front of the tension roller is moved down, the tension of the balance spring will increase, and the tension roller will stop where the tension of the tension wire and the tension of the balance spring become balanced.

c. Measures for 'E007'

Use fixing film displacement correction mode if 'E007' is indicated as follows:

1) Turn off the power switch, and leave the copier alone for about 10 min.
   - The temperature of the fixing heater will drop below 100°C.
2) Turn on the power switch.
   - The copier indicates 'C' on the control panel, and the fixing assembly becomes activated moving the fixing film (about 3 min).
3) After 3 min, the 'C' indication on the control panel will disappear when the fixing film returns to its appropriate position, and the copier enters standby state.

Caution:

The copier indicates 'C' on the control panel while it executes film displacement correction mode; advise the user that the indication does not refer to an error.

If 'E007' does not disappear after executing the above fixing film displacement correction mode, see the instructions under "Correcting the Displacement of the Fixing Film" in the Service Handbook (p.2-14).

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E. Detecting Jams

The copier is equipped with two copy paper sensors to check the presence/absence of copy paper and whether it is moving normally.

- pre-registration roller paper sensor (Q751)
- delivery sensor (PS3)

The presence/absence of copy paper or a jam is checked in reference to the presence/absence of copy paper at the respective sensors at such times as stored in the microprocessor in advance.

The copier keeps a record of the remaining number of copies to make or the copy mode effective at time of a jam. The microprocessor has the following five 'no paper/jam' detection sequences, and it also identifies a jam if any of the sensor detects copy paper at power-on.

1. Absence of Paper in the Multifeeder Pick-Up Assembly (pick-up delay jam)

In multifeeder mode, if copy.paper does not reach the registration sensor within a specific period of time, the copier identifies a jam, stops the main motor in about 3 sec, and indicates the Add Paper message. If the registration sensor detect copy paper within this 3-min period (approx.), the copier identifies a pick-up delay jam and flashes the Jam message.

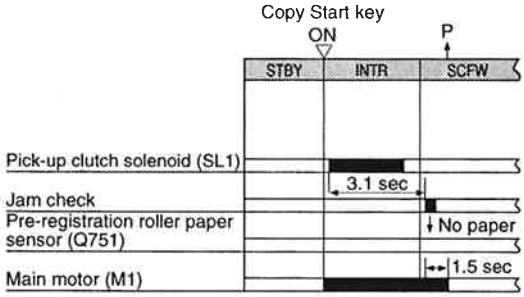

Figure 3-418 (normal)

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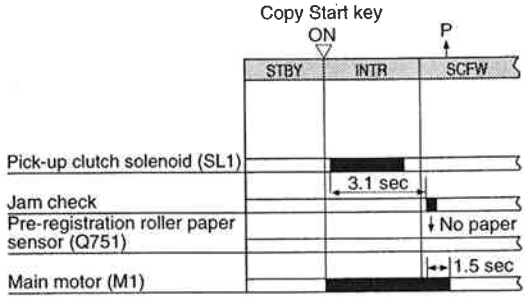

Figure 3-419 (no paper)

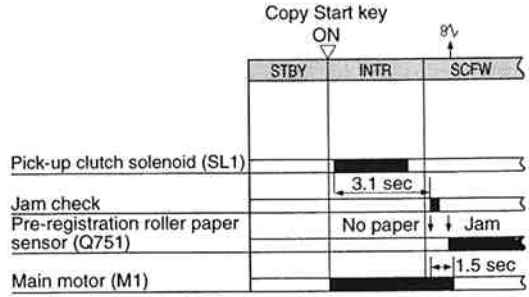

Figure 3-420 (jam)

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2. Cassette/Singlefeeder Pick-Up Delay Jam

a. Cassette Pick-Up Delay Jam

If copy paper does not reach the registration sensor within a specific period of time after the Copy Start key has been pressed, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message.

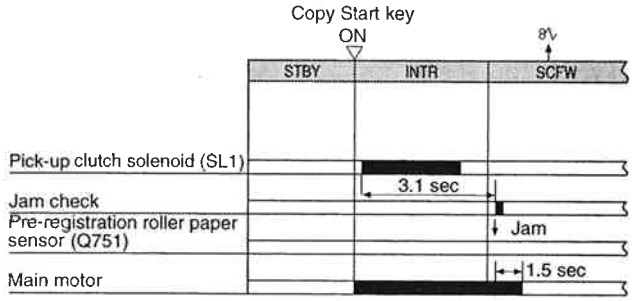

Figure 3-421

b. Singlefeeder Pick-Up Delay Jam

If copy paper does not reach the registration sensor within a specific period of time after paper has been picked up, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message.

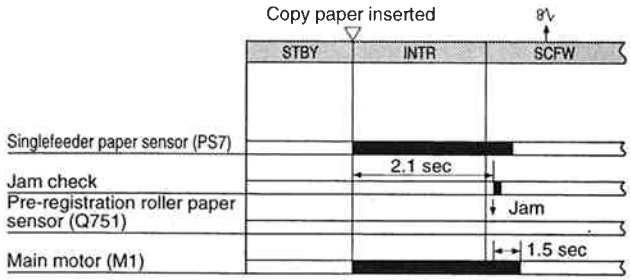

Figure 3-422

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3. Pick-Up Stationary Jam

If copy paper does not move past the registration sensor because of a feeding problem, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message. (This detection is not executed in singlefeeder mode.)

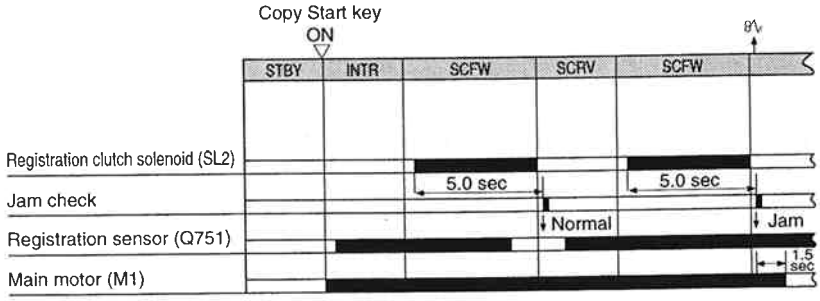

Figure 3-423

4. Delivery Delay Jam

If copy paper does not reach the delivery sensor within a specific period of time because of a feeding problem, the copier identifies a delivery delay jam, stops copying operation, and flashes the Jam message.

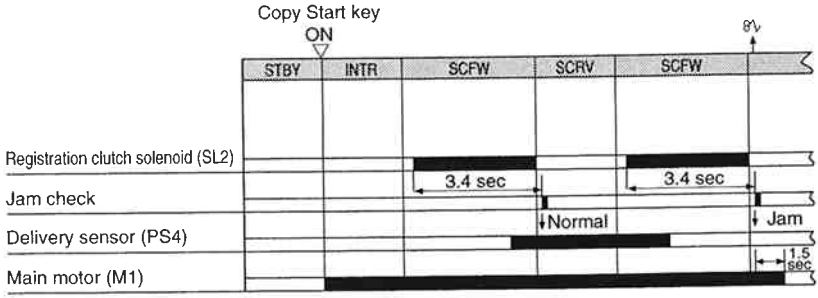

Figure 3-424

5. Delivery Stationary Jam

If copy paper does not reach the delivery sensor within a specific period of time because of a feeding problem, the copier identifies a delivery stationary jam, stops copying operation, and flashes the Jam message.

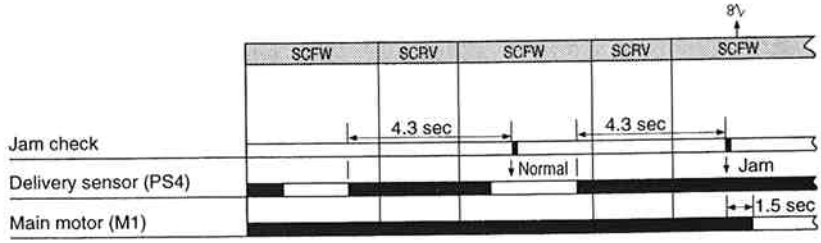

Figure 3-425

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V. FAN

The copier is equipped with one fan which serves to discharge ozone and cool the inside of the machine. The fan is driven directly by the main motor (M1) by means of a belt.

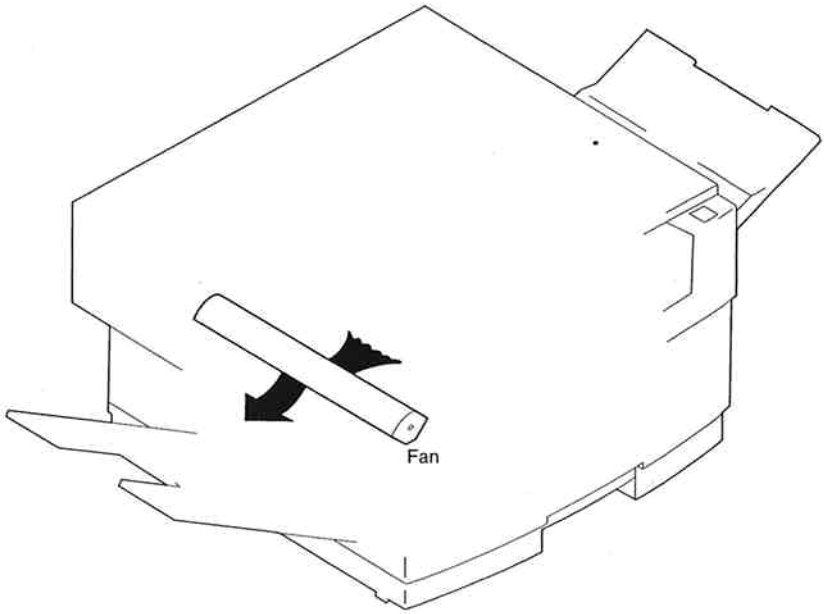

Figure 3-501

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VI. POWER SUPPLY

A. Distribution of Power

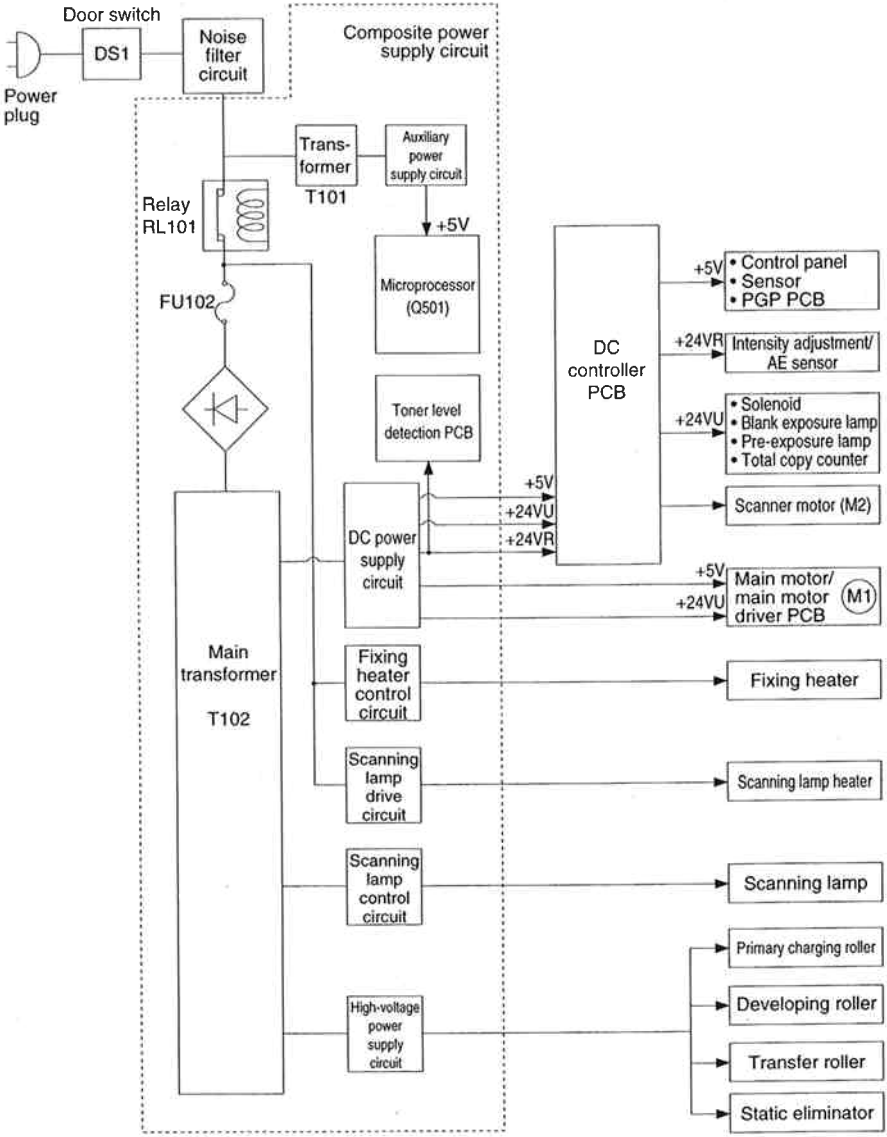

Figure 3-601

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B. Power Supply Circuit

The copier's power supply assembly consists of its DC power supply, scanning lamp power supply, and composite power supply circuit, and uses a single main transfer (T102) to supply high voltage. The copier's power supply is equipped with a microprocessor for exchange of data with the DC controller PCB.

The copier's power switch is a soft switch, and the copier is equipped with an auxiliary power supply to drive the soft switch. The auxiliary power supply provides the microprocessor (Q501) with +5V power while the power plug is connected and the door switch (DS1) is on.

AC power is supplied to the DC power supply assembly when the door switch (DS1) and the power switch on the control panel are turned on. The DC power supply generates +5 V, +24 VR, and +24 VU for the DC controller PCB.

When the power switch is turned off, power to the DC controller PCB is cut; to back up data on error codes (E000, E001, E002, E003), the copier uses a litium battery (BAT1) located within the DC controller circuit; using the battery, the appropriate error information will be indicated on the control panel when the power is returned, informing the presence of an error associated with the fixing heater.

⚠ Caution:
Replace the lithium battery only with the one listed in the Parts Catalog. Use of a different battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, or dispose of it in fire.
Keep the battery out of reach of children and discard any used battery promptly.

Reference:

The tolerances allowed for the DC voltage are as follows:

- +5 V ±5%
- +24 VR ±5%
- +24 VU ±12.5%

However, 24VR is designed as a 2-mode switch;

- during copying: 24 V ±5%
- during standby: 18 V ±10%

Moreover, the above values apply on the condition that the AC input tolerances are between -15% and +10%.

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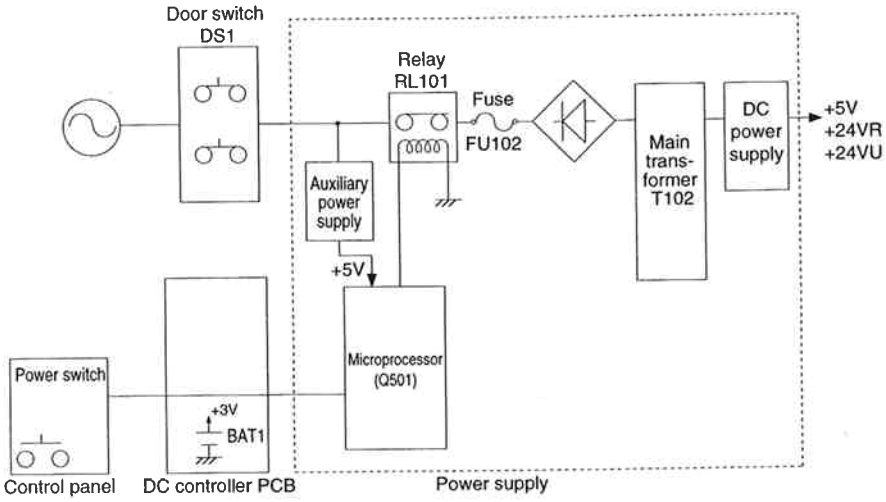

Figure 3-602

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C. Detecting Errors by the Composite Power Supply PCB

The copier's composite power supply PCB is equipped with a microprocessor (Q501) which serves to run a self diagnosis program to check the output from each power supply and its communications with the DC controller PCB.

When an error occurs, the microprocessor communicates with the DC controller PCB so that the results of self diagnosis may be indicated in the display on the control panel.

1. Overcurrent (low voltage)

If the composite power supply PCB finds an error in a DC load, it will turn off the relay (RL101) to cut off the AC input.

2. Error in the Control Value (high voltage)

If the composite power supply PCB finds that the difference between the setting and the actual value of either of the following voltages is not as specified, it will indicate 'E064' on the control panel.

- primary DC bias
- developing DC bias
- transfer bias

3. Error in the Control Value (low voltage)

If the composite power supply PCB finds that the difference between the setting for +24 V of the DC output and the control value is not as specified, it will indicate 'E803' on the display of the control panel.

4. Error in the Communication with the DC Controller

If the DC controller PCB finds an error in the communication between the DC controller PCB and the composite power supply PCB, 'E240' will appear in the display of the control panel for about 4 sec; thereafter, the relay (RL101) is turned off to cut off the AC input.

D. Protection Mechanism of the Power Supply Circuit

The composite power supply PCB has an overcurrent detection function which turns on to stop the output.

When the output has stopped, it may be reset by opening the copier's top unit, correcting the load, and turning on the power switch.

The built-in fuse (FU102), however, will blow if loads are repeatedly short circuited and reset.

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VII. ADF

A. Outline

The ADF picks up the originals stacked on the original tray starting with the topmost original, moves them through the copyboard, and delivers them.

See Figure 3-701 for an outline of the feeding route.

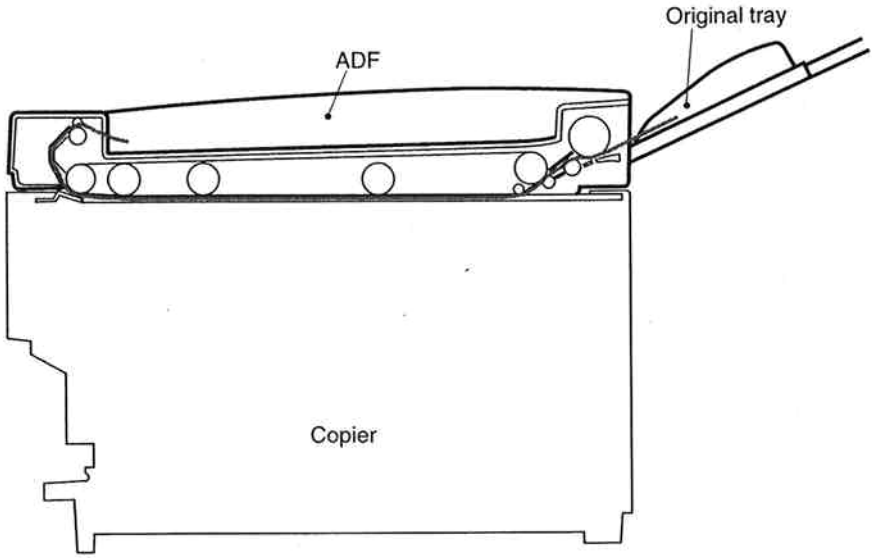

Figure. 3-701

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B Basic Construction

1. Outline of the Electric Circuitry

The ADF's major electrical mechanisms are controlled by the CPU on the ADF controller PCB.

The CPU on the ADF controller PCB reads the signals from the sensors and the copier and generates signals to drive the motor at such times as programmed in advance.

The copying modes selected on the copier are communicated to the ADF in serial, and the ADF communicates to the copier the state of feeding originals to the copier in serial. (It does not use an IC for communications.)

[Input block] [Control block] [Output block]

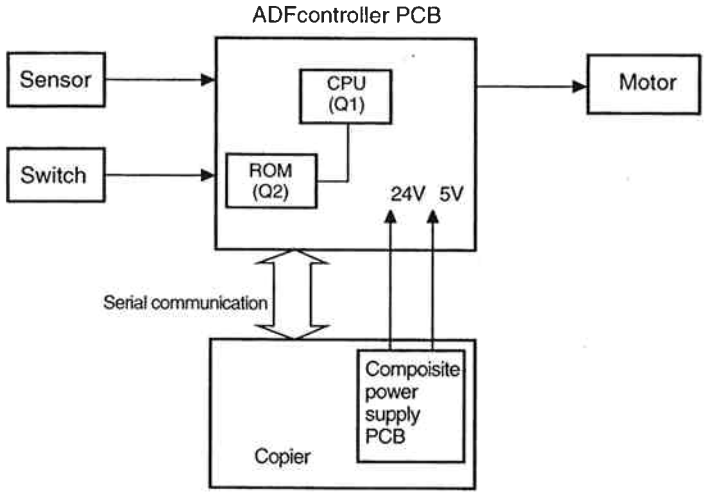

Figure 3-702

2. Inputs to and Outputs from the ADF Controller PCB

a. Inputs to and Outputs from the ADF Controller PCB (1/1)

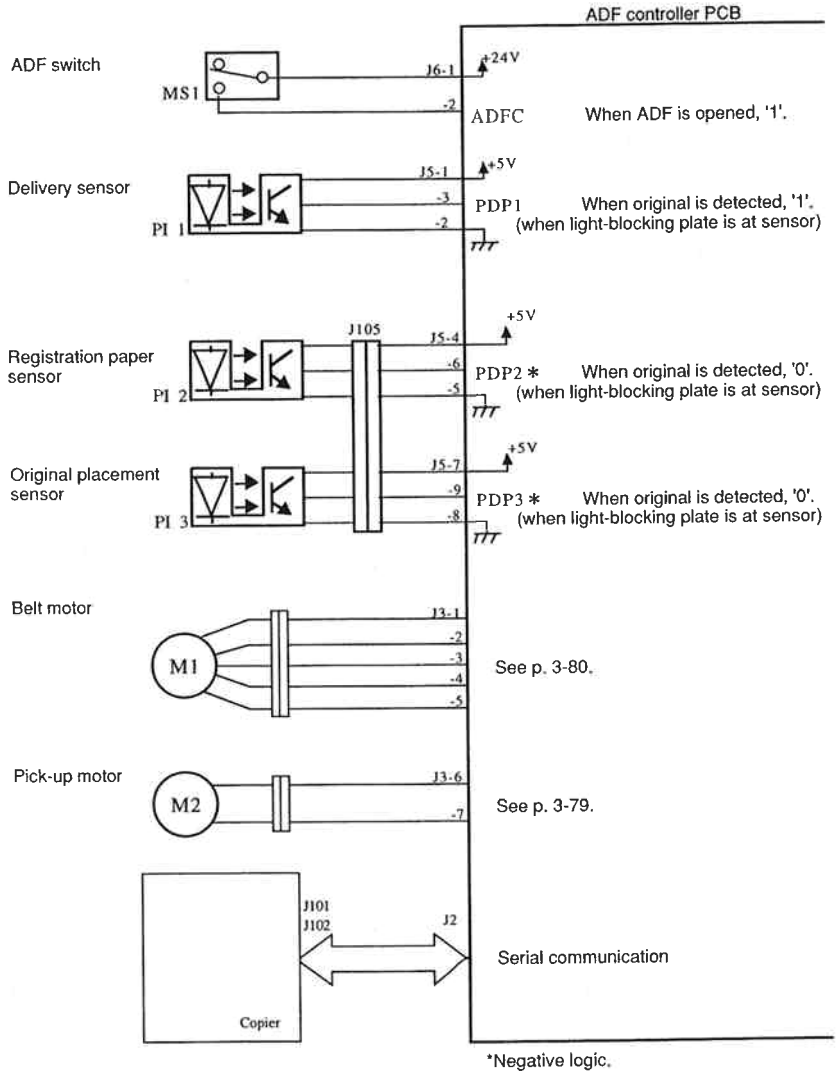

Figure 3-703

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B. Basic Operations

1. Outline

The ADF uses two motors for picking up and delivering originals. The pick-up motor (M2) is used to pick up originals, and the belt motor (M1) is used to move, stop, and deliver originals.

Further, the ADF is equipped with three sensors for monitoring the movement of originals.

The ADF is designed to accommodate one-sided original copying mode only.

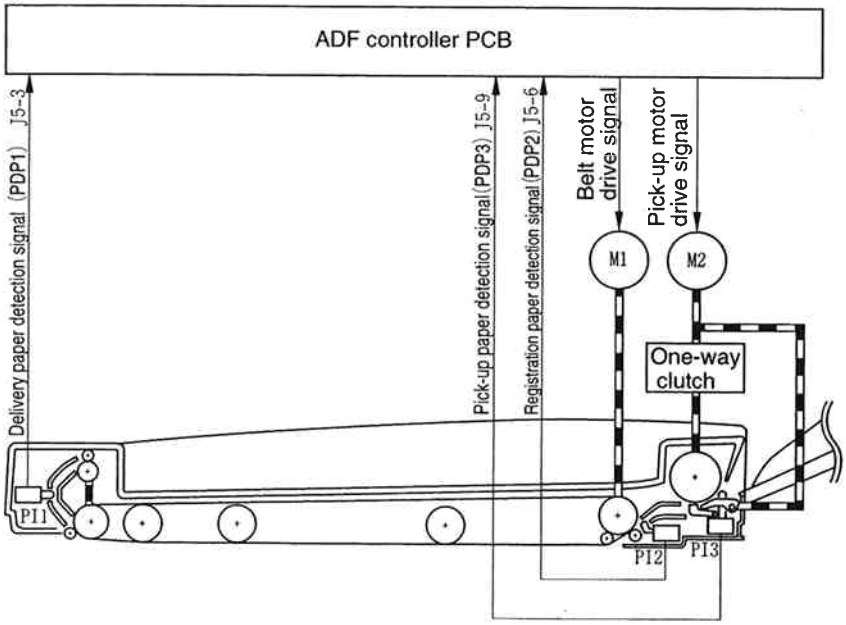

Figure 3-704

2. One-Sided Original Mode

The ADF picks up originals stacked on the original tray starting with the topmost original; after it picks up an original, it places it on the copyboard glass for copying, moves it away from the copyboard glass, and delivers it to the copyboard glass.

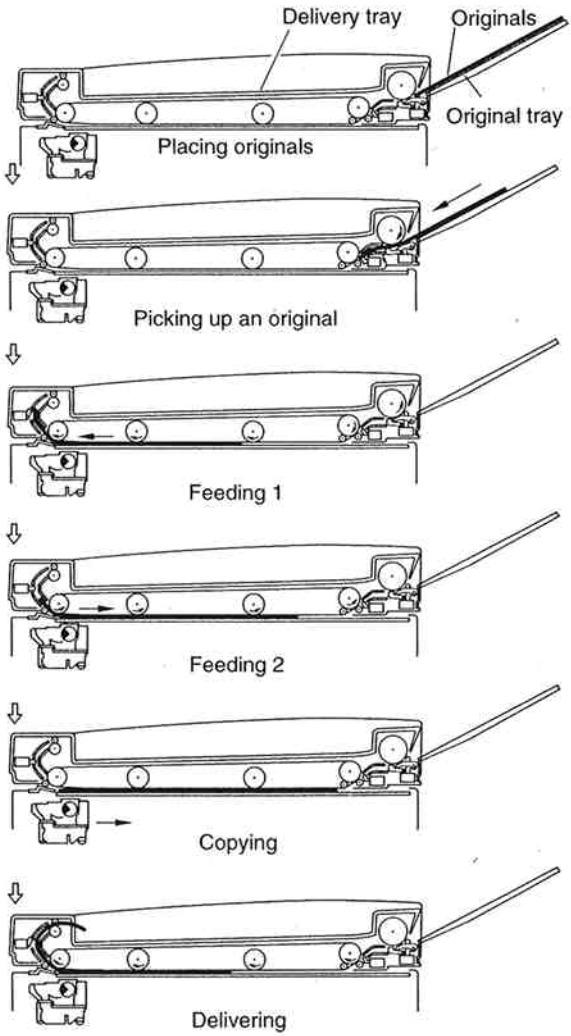

Figure 3-705

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C. Detecting an Original

1. Outline

The ADF's original detection mechanism has the following two functions:

1. Detecting the Presence/Absence of an Original
   Checks whether there is an original on the original tray.
2. Identifying the Length of the Original
   Checks the length of the original placed on the original tray.
2. Detecting the Presence/Absence of an Original

The original placement sensor (PI3) is used to check the presence/absence of an original.

When an original is placed on the original tray, the original placement sensor (PI3) sends the original detection signal (PDP3) to the ADF controller PCB in response to the movement of the detecting lever away from the sensor.

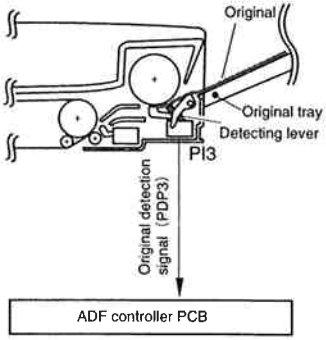

Figure 3-706

3. Identifying the Length of the Original

The registration paper sensor (PI2) is used to identify the length of the original, if any.

The ADF controller computes the length of the original based on the time it takes for the original to move past the registration paper sensor (PI2).

Using the result of the computation, the ADF controller determines whether the size of the original is A4/LTR or smaller or LGL, thereby switching to the appropriate ADF operation.

Table 3-701 shows the lengths of original that determines ADF operation sequence.

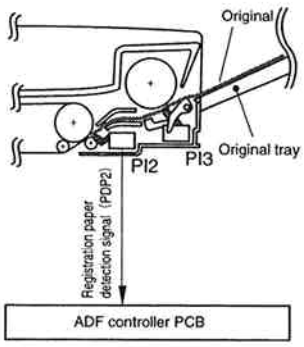

Figure 3-707

Original Lengths and Operation Sequences

Length	Sequence
~313mm	For A4/LTR originals
314mm~	For LGL originals

Table 3-701

D. Pick-Up Operation

1. Operation

When an original is placed on the original tray and the Copy Start key is pressed, the following sequence of operations takes place:

1 Preparing for Pick-Up Operation
When an original is placed on the original tray, i.e., the original placement sensor (PI3) turns ON, the pick-up roller rotates counterclockwise and the paper guide holds the original in place.

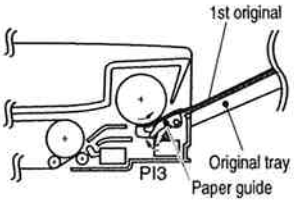

Figure 3-708

2 Pick-Up Separation
When the Copy Start key is pressed, the pick-up roller rotates clockwise, and picks up the first original (topmost) and forwards it as far as the registration roller. (The separation pad ensures that only one original is picked up.)

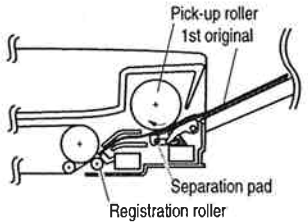

Figure 3-709

3 Arching
The first original is butted against the registration roller so that it arches.

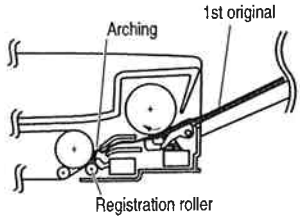

Figure 3-710

4 Feeding Operation 1
The feeding belt is moved so that the leading edge of the first original comes into contact with the delivery sensor (PI1). (In the case of a LGL original, the original is moved about 15 mm farther after it has come into contact with the delivery sensor.)
At the same time, the pick-up motor (M2) is rotated counterclockwise to prepare for picking up the second original.

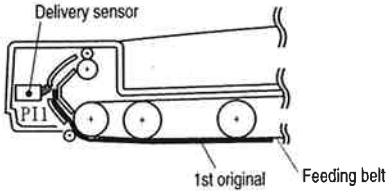

Figure 3-711

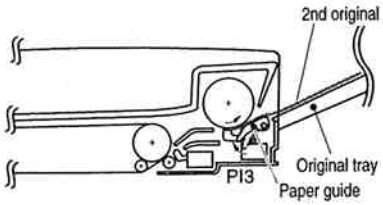

Figure 3-712

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5 Feeding 2
The feeding belt is moved counterclockwise so that the first original is stopped at a specific location on the copyboard glass.

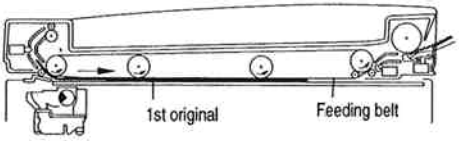

Figure 3-713

6 Moving the Scanner and Picking Up the Second Original
The scanner starts to move forward after the original has been stopped at a specific location on the copyboard glass.
If the original is A4/LTR or smaller, the pick-up motor (M2) is also rotated clockwise to pick-up the second original and butt it against the registration roller.
If the original is LGL, the second original is picked up after the scanner has been moved forward.

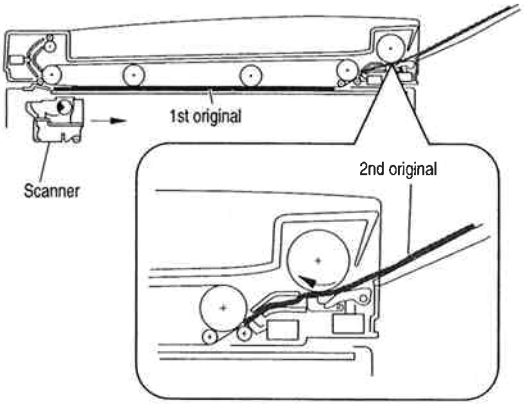

Figure 3-714

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2. Sequence of Pick-Up Operations (A4/LTR, 2 originals)

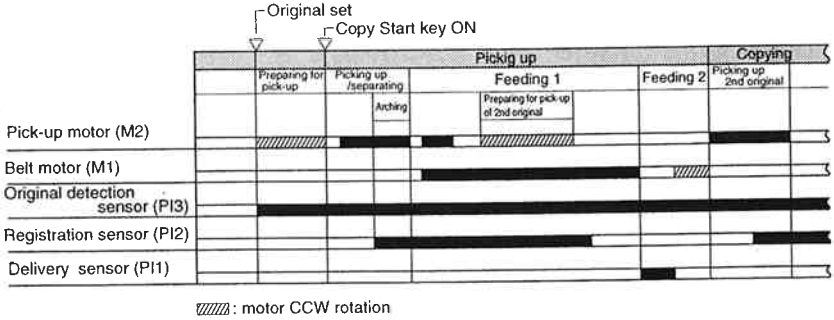

Figure 3-715

3. Sequence of Operations (LGL, 2 originals)

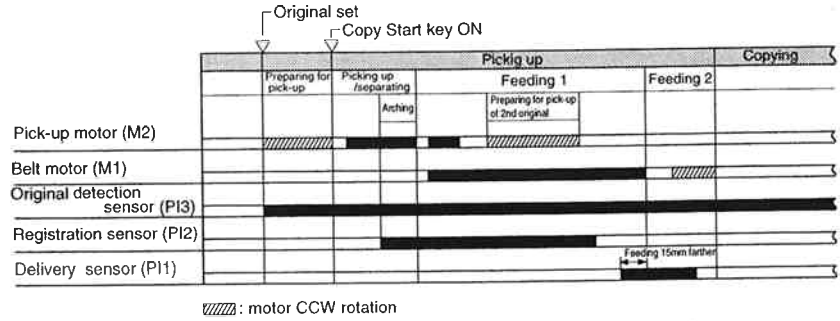

Figure 3-716

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E. Delivery

1. Operations

The ADF operates as follows to deliver originals from the copyboard glass:

1 Delivery Feeding

The feeding belt is moved to feed and deliver the first original on the copyboard glass. At the same time, the pick-up motor (M2) moves the second original to the copyboard glass.

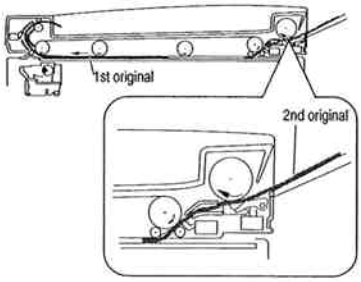

Figure 3-717

2 Delivering to the Delivery Tray

The ADF switches the belt motor to low speed as soon as the trailing edge of the original moves past the delivery sensor (PI1), thereby delivering the original slowly.

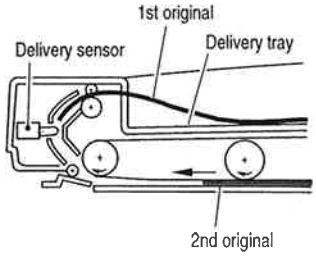

Figure 3-718

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2. Sequence of Operations (A4/LTR, 2 originals)

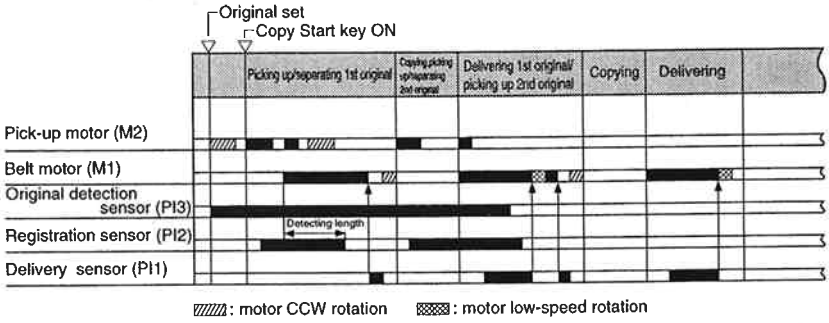

Figure 3-719

3. Sequence of Operations (LGL, 2 originals)

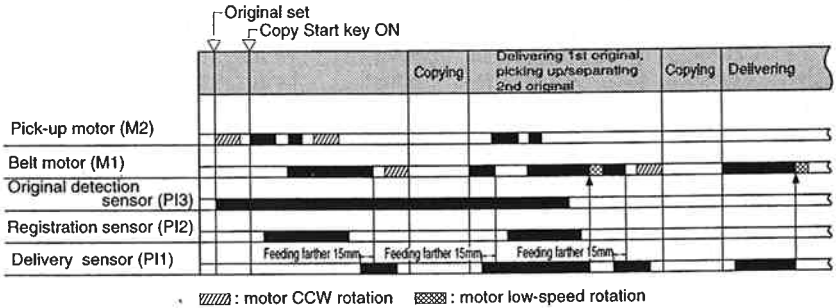

Table 3-720

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F. Controlling the Pick-Up Motor

1. Outline

Figure 3-720 is a diagram of the control circuit for the pick-up motor (M2).

The pick-up motor is a DC motor.

The CPU (Q1) on the ADF controller PCB sends the motor drive signals PM0 and PM1 to the motor driver (Q5). The pick-up motor rotates clockwise or counterclockwise according to the combinations of the states of these two signals. (Table 3-702 shows how the pick-up motor rotates for each combination.)

The motor driver is equipped with a limiter function, preventing overcurrent from flowing into the motor. When an overcurrent occurs, the limiter function cuts off the motor drive current, thereby preventing damage to the motor.

When the limiter function is activated, the pick-up motor cannot rotate as controlled, possibly leading to pick-up faults. Any pick-up fault causes the ADF controller to flash the JAM indicator on the copier and stop the pick-up motor at the same time.

Motor drive signal (PM0)	Motor drive signal (PM1)	Pick-up roller rotation
'1'	'1'	Braked
'1'	'0'	Picking up
'0'	'1'	Delivering
'0'	'0'	At reset (free)

Table 3-702

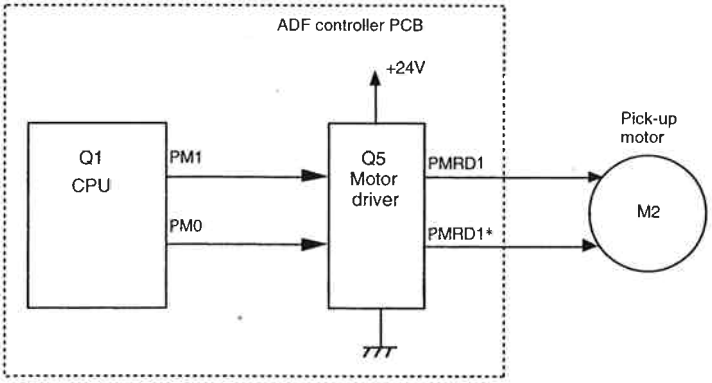

Figure 3-720

G. Controlling the Belt Motor

1. Outline

Figure 3-721 is a diagram showing the control circuit for the belt motor (M2).

The belt motor is a 4-phase control stepping motor.

The CPU (Q1) on the ADF controller PCB sends control pulse signals (A, A*, B, B*) to the motor driver (Q4).

In response, the motor driver changes the output timing of the pulse signals (MA, MA*, MB, MB*) used for driving the motor to rotate the belt motor clockwise or counterclockwise.

The motor driver is equipped with a limiter function used to keep the motor supplied with a specific current so that current greater than specified will not flow.

If loads large enough to activate the limiter function occur in succession, the belt motor cannot rotate as specified, possibly leading to feeding faults. Any feeding fault will cause the ADF controller to flash the Jam indicator on the controller and stop the belt motor at the same time.

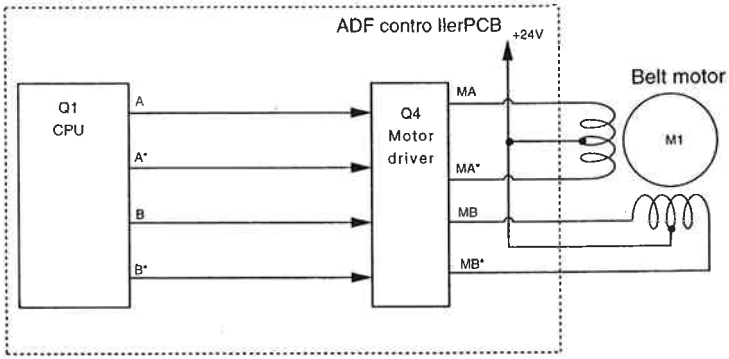

Figure 3-721

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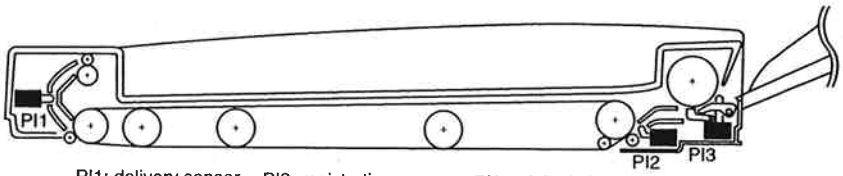
H. Detecting Original Jams

The ADF is equipped with three jam sensors (PI1 through PI3) as indicated in Figure 3-722 to monitor the movement of originals.

The movement of originals are checked at such times as programmed in the CPU on the ADF controller PCB; a jam is identified in relation to the presence of an original at each sensor.

Table 3-703 describes the type of jam, condition of detection, and sensors involved.



PI1: delivery sensor PI2: registration sensor PI3: original placement sensor

Figure 3-722

Type of Original Jam and Condition of Detection

Operation	Type of jam	Sensor	Conditions
Pick-up	Residual original	PI 1, PI 2	When the 1st original is separated, the delivery sensor (PI1) turns on while the belt motor rotates for 300 ms or less or before the registration sensor (PI2) turns on. When the 1st original is picked up, the registration sensor (PI2) and the delivery sensor (PI1) turn on.
	Original present at start	PI 1, PI 2	When separation starts, the registration sensor (PI2) or the delivery sensor (PI1) are on.
	Separation delay	PI 2	When separation starts, the registration sensor (PI2) does not turn on after 2 sec.
	Pick-up delay	PI 2	When pick-up starts, the registration sensor (PI2) does not turn off after feeding the original for about 500 mm.
Delivery	ADF open	MS1	The ADF is opened while in operation.
	Delivery delay jam	PI 1, PI 2	When delivery starts, the delivery sensor (PI1) does not detect an original that has been fed about 100 mm. After the registration sensor (PI2) has turned off, the delivery sensor (PI1) does not detect an original that has been fed for about 500 mm.
	Delivery stationary jam	PI 1	During pick-up, the delivery sensor (PI1) remains on even when the original is fed for 'length + about 60 mm'.

Table 3-703

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I. Power Supply

1. Outline

Figure 3-723 shows the routes of power supply.

The ADF is supplied by the copier with 5 V and 24 V. The 24V supply is cut off when the ADF is opened, i.e., when the ADF switch (MS1) turns off. The 5V supply will continue to keep each sensor powered even when the ADF is opened.

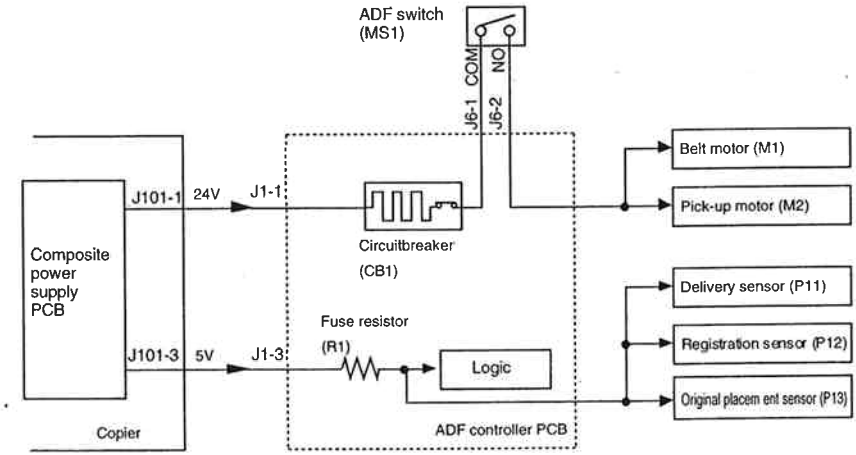

Figure 3-723

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VIII. STANDARDS AND ADJUSTMENTS

1. Actions to Take After Replacement

Part	Work	Remarks
Scanning lamp	1. Adjust the intensity of the scanning lamp. 2. Execute AE adjustment.	
Intensity/AE sensor PCB	1. Adjust the intensity of the scanning lamp. 2. Execute AE adjustment	
Composite power supply PCB	1. Adjust the intensity of the scanning lamp. 2. Execute AE adjustment. 3. Execute measurement voltage correction for APVC (PW_OFST). 4. Execute measurement current correction for APVC (IP_ADJ).	
Pre-exposure lamp	1. Adjust the pre-exposure lamp output. (PREX_LP)	
DC controller PCB	1. Adjust the intensity of the scanning lamp. 2. Execute AE adjustment. 3. Adjust the image leading edge non-image width (LE_BLANK). 4. Adjust the image leading edge margin (REGST). 5. Execute primary charge output voltage correction (PRIMARY).* 6. Execute APVC measurement current correction (IP_OFST).* 7. Execute measurement voltage correction for APVC (PW_OFST). 8. Execute measurement current correction for APVC (IP_ADJ). 9. Execute ratio fine adjustment (LENS_ADJ). 10. Execute pre-exposure lamp output adjustment (PREX_LP).	*: Only if the model is not equipped with the automatic indication of drum cartridge replacement time.
Drum unit	1. Execute primary corona output voltage correction (PRIMARY). 2. Execute measurement voltage correction for APVC (PW_OFST).	Only if the model is not equipped with the automatic indication of drum cartridge replacement time.
ADF controller PCB	1. Execute original leading edge stop position.	NP6012F/NP6212 only.

Table 3-801

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2. Adjusting the Intensity of the Scanning Lamp

Adjust the intensity of the scanning lamp whenever you have replaced any of the following parts:

- DC controller PCB
- composite power supply PCB
- AE/intensity sensor PCB
- scanning lamp

1) Set the density correction dial (VR107) to the center notch.

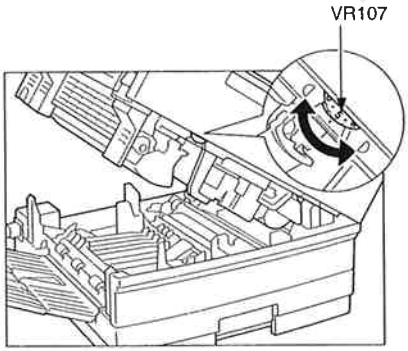

Figure 3-801

2) Turn off the AE mechanism, and set the copy density adjusting lever to the center notch.
3) Place the Test Chart (NB-3, NA-2, NA-3) on the copyboard, and make copies.
4) Turn VR101 on the DC controller PCB fully counterclockwise.
5) Turn VR101 on the DC controller PCB so that gray scale No. 9 is barely visible.

Caution:

Check gray scale No. 10 if you are using NB-3.
If you have turned VR101 fully clockwise, turn it fully counterclockwise before making adjustments once again.

Direction of VR101 and Copy Density

Direction	Density
Clockwise	Darker
Counterclockwise	Lighter

Table 3-802

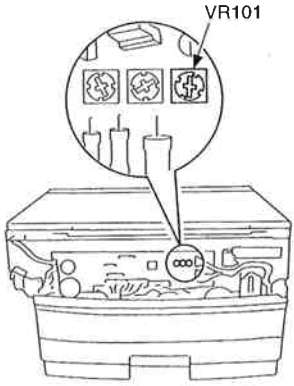

Figure 3-802

3. AE Adjustment

Execute AE adjustment whenever you have replaced any of the following parts:

- DC controller PCB
- Composite power supply PCB
- AE/intensity sensor PCB
- scanning lamp

Preparing for Adjustment

- Obtain a newspaper with even density; avoid one with photos and large titles.
- Obtain five sheets of copy paper.
- Make sure that the intensity of the scanning lamp has been properly adjusted.

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1) Turn on the copier.
2) Short the two jumper wires (JP3, JP4) on the DC control PCB with a screwdriver.
   • The ratio/count indicator indicates 'F'.

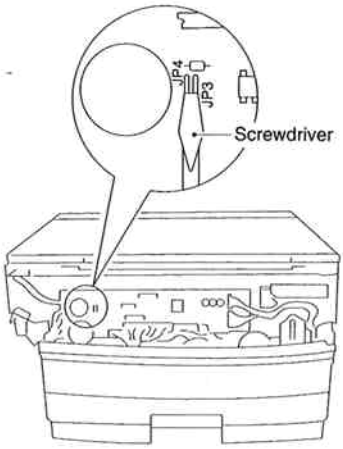

Figure 3-803

3) Stop shorting the jumpers; then, using the +/- key, bring up '40' on the ratio/count indicator, and press the Start key.
   • The scanning lamp will turn on, and the main motor (M1) will start to rotate.
4) Turn VR103 on the DC controller PCB fully clockwise.

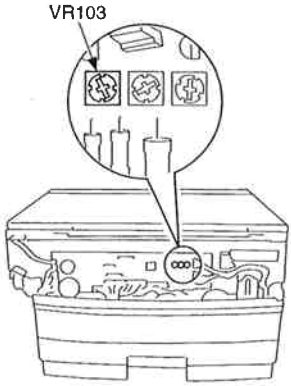

Figure 3-804

5) Place a newspaper on the copyboard, and close the copyboard cover.
6) Adjust VR102 so that the indication in the display is b2 through bc.

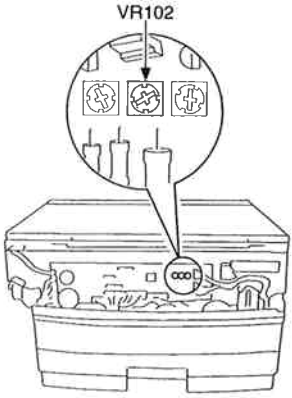

Figure 3-805

7) Remove the newspaper from the copyboard, and place a stack of five sheets of copy paper on the copyboard glass in its place; then, close the copyboard glass.
8) Adjust VR103 on the DC controller PCB so that the indication on the control panel is 53 through 5d.

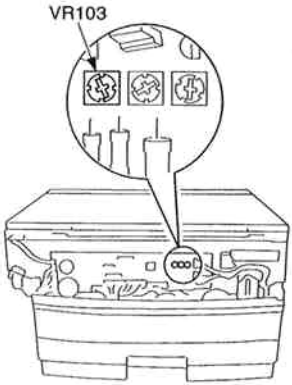

Figure 3-806

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9) Make a copy, and make sure that it is free of fogging yet its text is dark enough.
   - If the copy is foggy or the text density is too light, repeat starting with step 1).
   - If no change is noted in the results after re-adjustment, make further adjustments using the density correction dial (VR107).

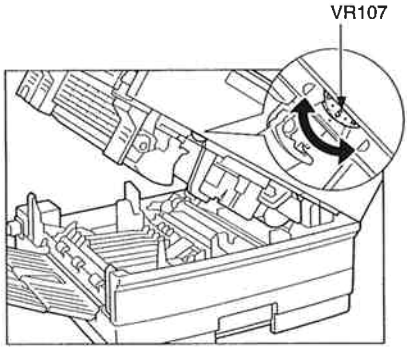

Figure 3-807

4. Leading Edge Non-Image Width

Make this adjustment whenever you have replaced the following:
- DC controller PCB

Make sure that the leading edge non-image width is 2.0 ±1.5 mm when the Test Chart is copied.

Caution:
You must adjust the image leading edge margin whenever you have made this adjustment.

Figure 3-808

Making Adjustments

1) Select '31' in service mode; then, using the +/- key, change the setting in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 99.
   - The default is 32.

Relationship between the Setting and the Image Leading Edge Non-Image Width

Setting	Image leading edge non-image width
High	Increases
Low	Decreases

Table 3-803

2) After making the adjustment, record the new setting on the service label attached behind the control panel.

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5. Image Leading Edge Margin (registration on timing)

Make this adjustment whenever you have replaced the following:

- DC controller PCB

Make sure that the leading edge margin is 1.0 and 4.0 mm when the Test Chart is copied.

Caution:

You must make sure that the image leading edge non-image width is within the standard before making this adjustment.

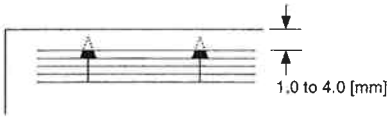

Figure 3-809

Making Adjustments

1) Select '30' in service mode; then, using the +/- key, change the setting in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 99.
   - The default is 14.

Relationship between the Setting and the Image Leading Edge Non-Image Width

Setting	Image leading edge non-image width
High	Increases
Low	Decreases

Table 3-804

2) After making the adjustment, record the new setting on the service label attached behind the control panel.

6. Primary Corona Output Voltage Correction (model without automatic indication of drum unit replacement time only)

Execute this adjustment whenever you have replaced the following:

- DC controller PCB
- drum unit

Making Adjustments

- After Replacing the DC Controller PCB

1) Select '32' in service mode; then, using the +/- key, enter the setting 'PRIMARY' recorded on the service label attached behind the control panel in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 30.

2) Turn off and then on the copier.

- After Replacing the Drum Unit

1) Select '32' in service mode; then, using the +/- key, enter the setting 'PRIMARY' recorded on the service label attached behind the control panel in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 30.

2) Turn off and then on the copier.

3) After making the adjustment, record the new setting on the service label attached behind the control panel.

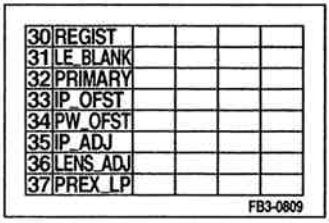

Figure 3-810

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7. APVC Measurement Current Correction (model without automatic indication of drum unit replacement time only)

Execute this adjustment whenever you have replaced the following:

- DC controller PCB
- drum cartridge

Making Adjustments

- After Replacing the DC Controller PCB

1) Select '33' in service mode; then, using the +/- key, enter the setting 'IP_OFST' recorded on the service label attached behind the control panel in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 99.

2) Turn off and then on the copier.

- After Replacing the Drum Cartridge

1) Select '33' in service mode; then, using the +/- key, enter the setting 'IP_OFST' recorded on the service label attached to the drum cartridge in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 99.

2) Turn off and then on the copier.

3) After making the adjustment, record the new setting on the service label attached behind the control panel.

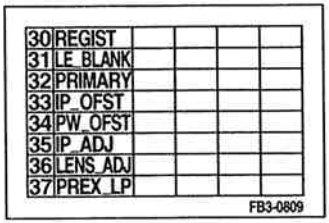

Figure 3-811

8. Measurement Voltage Correction for APVC

Make this adjustment whenever you have replaced the following:

- DC controller PCB
- composite power supply PCB

Making Adjustments

- After Replacing the DC Controller PCB

1) Select '34' in service mode; then, using the +/- key, enter the setting 'PW_OFST' recorded on the service label attached behind the control panel in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 30.
   - The default is 15.

2) Turn off and then on the copier.

3) After making the adjustment, execute user mode 'U7'.

- After Replacing the Composite Power Supply PCB

1) Select '34' in service mode; then, using the +/- key, enter the setting 'PW_OFST' recorded on the service label attached to the composite power supply PCB in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 30.,
   - The default is 15.

2) Turn off and then on the copier.

3) After making the adjustment, record the new setting on the service label attached behind the control panel.

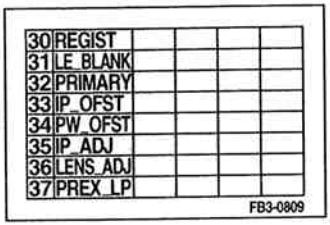

Figure 3-812

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4) After making the adjustment, execute user mode 'U7'. (This step applies only if the machine is equipped with the drum unit replacement time automatic indication function.)

9. Measurement Current Correction for APVC

Make this adjustment whenever you have replaced the following:

- DC controller PCB
- composite power supply PCB

Making Adjustments

- After Replacing the DC Controller PCB

1) Select '35' in service mode; then, using the +/- key, enter the setting 'IP_ADJ' recorded on the service label attached behind the control panel, and press the AE key.
   - The setting may be between 0 and 30.
   - The default is 15.

2) Turn off and then on the copier.

- After Replacing the Composite Power Supply PCB

1) Select '35' in service mode; then, using the +/- key, enter the setting 'IP_ADJ' recorded on the service label attached to the composite power supply PCB in the count/ratio indicator, and press the AE key.
   - The setting may be between 0 and 30.
   - The default is 15.

2) Turn off and then on the copier.

3) Record the new setting under 'IP_ADJ' on the service label.

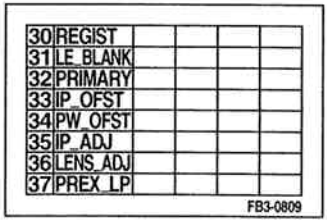

Figure 3-813

10. Reproduction Ratio Fine Adjustment

Make this adjustment whenever you have replaced the following:

- DC controller PCB

Making Adjustments

1) Select '36' in service mode; then, using the +/- key, enter the setting 'LENS_ADJ' recorded on the service label, and press the AE key.
   - The setting may be between 0 and 30.
   - The default is 15.

2) Turn off and then on the copier.

11. Pre-Exposure Lamp Output Adjustment

Make this adjustment whenever you have replaced the following:

- DC controller PCB
- Pre-exposure lamp

Making Adjustments

- After Replacing the DC Controller PCB

1) Select '37' in service mode; then, using the +/- key, enter the setting 'PREX_LP' recorded on the service label, and press the AE key.
   - The setting may be between 0 and 99.
   - The default is 50.
2) Turn off and then on the copier.
3) After making the adjustment, execute user mode 'U7'.

- After Replacing the Pre-exposure lamp

1) Select '37' in service mode; then, using the +/- key, enter the setting recorded on the label attached to the replaced pre-exposure lamp, and press the AE key.
   - The setting may be between 0 and 99.
   - The default is 50.
2) Turn off and then on the copier.

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3) After making the adjustment, record the new setting on the service label attached behind the control panel.

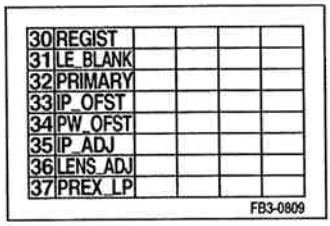

Figure 3-814

4) After making the adjustment, execute user mode 'U7'. (This step applies only if the machine is equipped with the drum unit replacement time automatic indication function.)

12. Adjust the Original Leading Edge Stop Position

You must first correct original skew and adjust the rear/front original stop position before adjusting the original leading edge stop position.

1) Obtain a sheet of A4 or LTR white copy paper, and draw two lines as indicated.
   - The sheet will be used as a test chart.

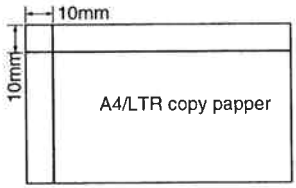

Figure 3-815

2) Remove the screw, and remove the ADF controller cover.

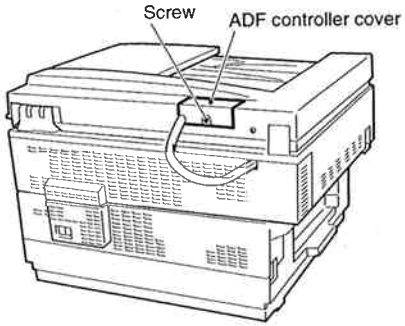

Figure 3-816

3) Turn on the copier, and place the test chart prepared in step 1) on the original tray.

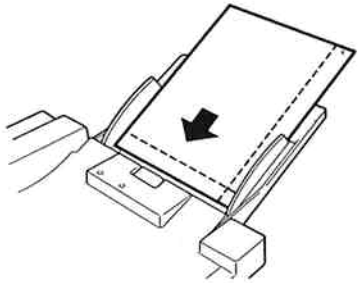

Figure 3-817

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4) Press the Copy Start key to make a copy.
5) Check to make sure that he distance L4 on the copy image indicated is 10 +2.0, -2.5 mm (standard) or less.

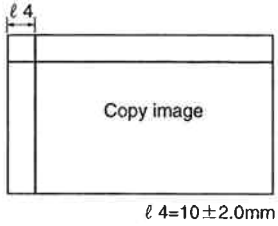

Figure 3-818

6) If the distance is not as specified, shift bit 1 of the DIP switch (SW1) on the ADF controller PCB to ON, and place an A4 or LTR white copy paper on the original tray.

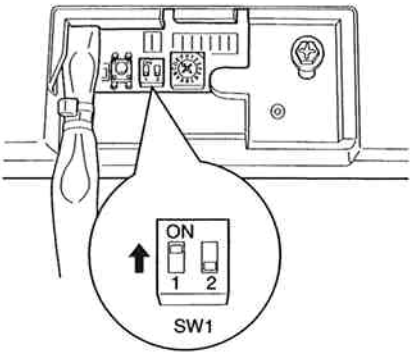

Figure 3-819

7) Press the push switch (PSW) on the ADF controller PCB.
   • The copy paper will be picked up from the original tray and stopped on the copyboard glass.

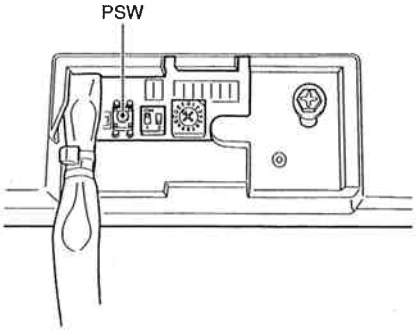

Figure 3-820

8) Use the rotary switch (SW2) on the ADF controller PCB to adjust the original leading edge stop position.
   Moving the rotary switch by a single notch changes the original stop position by about 0.3 mm.
   Press the push switch (PSW) after deciding on a position to discharge the copy paper and store the optimum value.

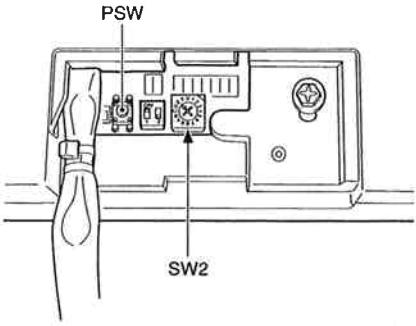

Figure 3-821

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Relationship between Rotary Switch Direction and Original Position

Direction of rotary switch	Position (shift) of original
Clockwise	Toward leading edge
Counterclockwise	Toward trailing edge

Table 3-805

■ Example

If L4 is 13 mm,

You must shift the original stop position toward the leading edge by 3 mm.

1) Place a sheet of A4 or LTR white copy paper on the original tray.
2) Shift bit 1 of the DIP switch (SW1) on the ADF controller PCB (SW1) to ON; then, push the push switch (PSW) to pick up the copy paper.

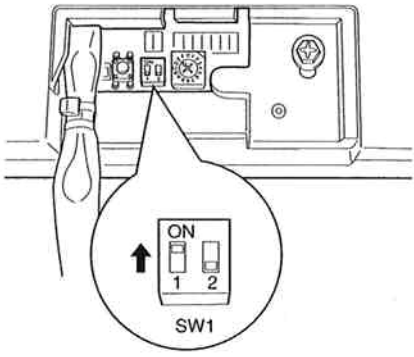

Figure 3-822

3) Turn the rotary switch (SW2) on the ADF controller PCB clockwise by 10 notches.

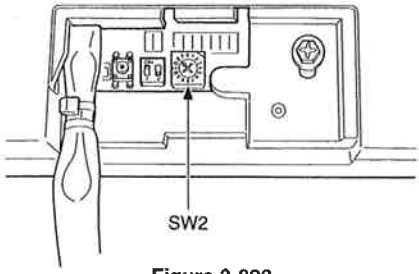

Figure 3-823

4) Press the push switch (PSW) on the ADF controller PCB.
   - The copy paper on the copyboard will be discharged, and the optimum value will be stored.

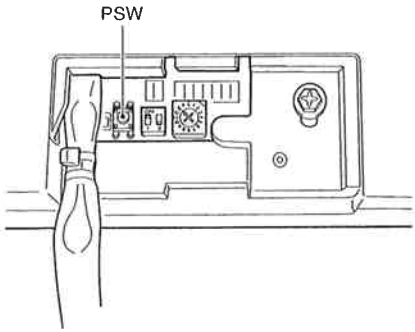

Figure 3-824

13. Checking the Photointerrupters

1) Set the meter to the 12VDC range.
2) Connect the probe ① of the meter to GND the grounding terminal ② on the DC controller PCB.

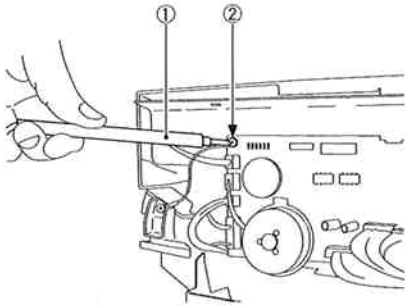

Figure 3-825

3) Make checks according to the instructions.

Reference:

The photointerrupters other than those indicated are connected in a matrix

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No.	PS1		PS2	
Name	Scanner home position sensor (SCHP)		Lens home position sensor (LHP)	
+ probe	J101-1		J109-9	
Normal if as described	Move the scanner by hand while in standby.		Move the lens mount by hand while in standby	
	When the scanner is at home position	When the scanner is not at home position	When the light-blocking plate is over the sensor	When the light-blocking sensor is not over the sensor
Voltage measured by meter (approx.)	0 V	5 V	0 V	5 V

No.	PS4		Q751	
Name	Belt displacement sensor (FFD)		Pre-registration roller sensor (RPD)	
+ probe	J112-1		J108-4	
Normal if as described	Move the detecting lever by hand while in standby		Move the detecting lever by hand while in standby	
	When the light-blocking plate is over the sensor	When the light-blocking sensor is not over the sensor	When the detecting lever is not moved	When the detecting lever is not moved
Voltage measured by meter (approx.)	0 V	5 V	5 V	0 V

Table 3-806

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IX SERVICE MODE

A. Outline

The copier's service mode may be classified into the following four:

No.	Mode
[30]	Adjustment
[40]	Operation/inspection
[50]	Machine settings
[60]	Counter

Table 3-901

B. Using Service Mode

1. Starting Service Mode

1) Open the copier's top unit, and remove the two screws ①; then, remove the upper front cover ②.

Caution:
A flexible cable for the control panel is connected to the front upper cover; take care not to damage the cable.

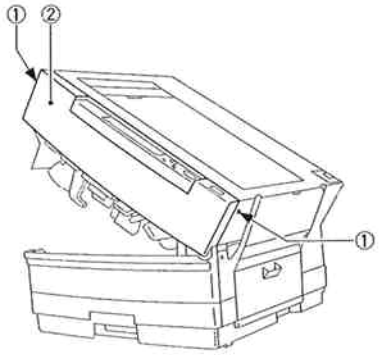

Figure 3-901

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2) Turn on the copier, and short the jumper wires JP3 and JP4 on the DC controller PCB with a screwdriver.
   • The count/ratio indicator on the control panel turns on 'F'.

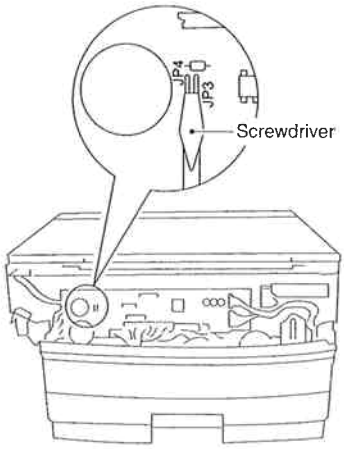

Figure 3-902

3) When 'F' has turned on, stop shorting the jumper wires JP3 and JP4.

2. Ending Service Mode

1) Press the Clear/Stop key.

3. Selecting Items in Service Mode

1) While the count/ratio indicator is indicating 'F', choose the appropriate item by pressing the +/- key.
   • The tens column of the classification number starts to flash.
   • The number changes between 30 and 62 in response to the key operation.
2) Press the Start key to select the item.
   • The flashing classification number changes to the flashing current setting.

4. Using Adjustment Mode and Machine Settings Mode

1) Change the setting by pressing the +/- key.
   • The setting starts to flash.
2) Press the AE key to select the setting.
   • The setting stops flashing and remains on.
   • A press on the Start key starts copying operation. (adjustment mode '30' only)
3) To change the setting once again, repeat steps 1) and 2) without an interruption.
4) Press the Clear/Stop key to return to item selection.

5. Using Operation/Inspection Mode

1) Press the Start key to execute the appropriate service mode.
   • The item number keeps flashing while the mode is being executed.
2) Press the Clear/Stop key so that item selection returns after operation.
   • If the mode is of a type that automatically ends the operation, item selection will return automatically.

6. Resetting a Back-Up Error Code

If 'E000', 'E001', 'E002', or 'E003' is indicated, remove the cause of the error, and reset the error as follows:

1) While shorting the jumper wires JP3 and JP4 on the DC controller PCB with a screwdriver, turn on the copier.
   • The count/ratio indicator turns on 'F'.
2) Turn off and then on the copier to check copying operation.

Caution:

The power turns off automatically upon detection of 'E000, 'E001', 'E002', or 'E003'. If you turn on the power in this condition, the error code in question will appear once again and the power will turn off automatically once again. To find out which error code turns off the power, perform the foregoing steps after disconnecting the heater connector (J207) from the composite power supply PCB to protect the heater.

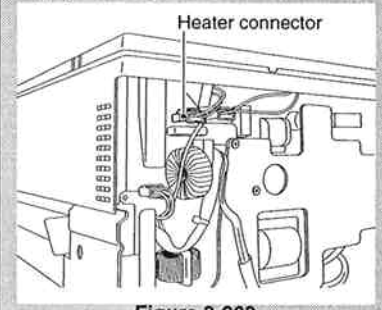

Figure 3-903

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7. Filling Out the Service Label

Figure 7-4 shows the label attached behind the front upper cover. Each machine is adjusted and set at the factory, and the settings are recorded on the label.

You must correct the settings recorded on the label whenever you have entered new settings.

If you have replaced the DC controller, be sure to enter the settings recorded on the label. Further, if you have replaced the composite power supply PCB or the pre-exposure lamp, you must enter the settings recorded on the label attached to the service label and copy the settings to the service label.

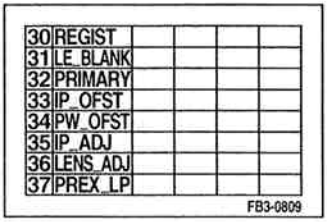

Figure 3-904

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C. Adjustment Mode

1) Choose an item using the +/- key, and press the Start key to select it.
2) Increase or decrease the setting using the +/- key.
3) Press the AD key to store the setting.
4) If you changed the setting under No. 34 or No. 37 on a machine equipped with the drum unit replacement time automatic display function, turn off and then on the power. When you turn off and then on the power, the main motor will rotate and stop about 1 min later. If the machine is NOT equipped with the function, go to step 5).
5) To clear the Item, press the Clear/Stop key.
6) After changing the setting, record the new setting on the service label.
   - A press on the Start key while a description of service mode is indicated will start copying operation.
7) If you changed the setting of No. 34 or No. 37 on a machine is NOT equipped with the drum unit replacement time automatic display function, execute 'U7 installation/drum unit replacement mode' in user mode.

Item No.	Function	Settings	Description
30	Image leading edge margin adjustment	0~99	A higher setting will delay the copy paper in relation to the image, thereby decreasing the margin. default: 14
31	Image leading edge non-image width	0~99	A higher setting will increase the image leading edge non-image width. default: 32
32	Primary charging output voltage correction value (PRIMARY)	0~30	Use it to enter the setting recorded on the label on the drum cartridge after replacement of the drum cartridge. (You need not enter the setting if the machine has the drum unit replacement time automatic display function.)
33	APVC measurement current correction value (IP_OFST)	0~99	Use it to enter the setting recorded on the drum cartridge after replacement of the drum cartridge. (You need not enter the setting if the machine has the drum unit replacement time automatic display function.)
34	Execute measurement voltage correction for APVC (PW_OFST).	0~30	Use it to enter the setting recorded on the label on the composite power supply PCB after replacement of the composite power supply PCB. default: 15
35	Measurement current correction value at time of APVC (IP_ADJ)	0~30	Use it to record the setting recorded on the label on the composite power supply PCB after replacement of the composite power supply PCB. default: 15
36	Reproduction ratio fine adjustment (LENS_ADJ)	0~30	Use it to enter the setting recorded on the label on the service label attached behind the control panel after replacement of the DC controller PCB. default: 15
37	Pre-exposure lamp output adjustment value (PREX_LP)	0~99	Use it to enter the setting recorded on the label on the pre-exposure lamp after replacement of the pre-exposure lamp. default: 50

Table 3-902

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D. Operation/Inspection Mode

1) Choose the appropriate item using the +/- key, and press the Start key to select it.
2) Press the Start key to execute the operation.
3) To stop, press the Clear/Stop key.
   • If the mode is of a type that automatically stops operation, item selection will return automatically after the operation.

Item No.	Function	Description
40	AE adjustment check mode	The scanning lamp turns on, the main motor rotates, and the AE sensor setting appears.
41	Toner supply mode	Use it when replacing the developing assembly. Toner is stirred and supplied to the developing assembly. The operation stops automatically after about 10 to 60 sec.
42	Back-up RAM clear	Operation 1) Using the +/- key, select No. 42. • '4' flashes. 2) Press the Start key to select the appropriate item. • '42' flashes. 3) Press the AE key. • The indication changes to 'EE'. 4) Press the Start key. • The indication changes to '42', and '4' flashes. 5) Turn off and then on the power switch. • The backup RAM will be cleared, and the default settings will be stored to all adjustment modes and No. 50 and No. 51 of machine settings mode. • The indication changes to flashing '1' (if paper exists in the cassette) and the main motor rotates for about 1 min and stops. **Reference:** To stop clearing the RAM, press the Clear/Stop key before moving to step 4).

Table 3-903

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E. Machine Settings Mode

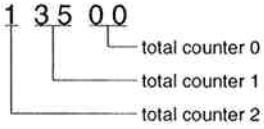
1) Choose the appropriate item using the +/- key, and press the Start key to select it.
2) Change the setting using the +/- key.
3) Press the AE key to store the setting.
4) To clear the item, press the Clear/Stop key.

Item No.	Function	Settings	Description
50	Changing the upper limit for copies	0~99	Setting it to '0' sets the upper limit to 100. default: 0
51	Selecting density adjustment mode	0~99	Use it to decide on whether the density adjustment mode at power-on should be AE or manual. 0: AE mode other than 0: manual mode default: 0

Table 3-904

F. Counter Mode

Use this mode to check the total copy counter. (If the machine is equipped with the drum unit replacement time automatic display function, indicates the number of copies processed by the existing drum unit.) The indication will be in tens/ones and thousands/hundreds, and ten thousands;
for example, if 13,500 copies,



1) Choose an item using the +/- key, and press the Start key to select it.
2) To clear the item, press the Clear/Stop key.

Item No.	Function	Description
60	Total counter 0	Indicates tens and ones.
61	Total counter 1	Indicates thousands and hundreds.
62	Total counter 2	Indicates ten thousands.

Table 3-905

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G. Reproduction Ratio Fine Adjustment

Use this mode after replacing the following:

- DC controller PCB

Operation

1) Select '36' in service mode; and using the +/- key, enter the setting under 'LENS_ADJ' on the service label, and press the AE key.

H. Pre-Exposure Lamp Output Adjustment

Use this mode after replacing the following:

- DC controller PCB
- Pre-exposure lamp

Operation

- After Replacing the DC Controller PCB

1) Select '37' in service mode; and using the +/- key, enter the setting under 'PREX_LP' recorded on the service label, and press the AE key.

- After Replacing the Pre-Exposure Lamp

1) Select '37' in service mode; using the +/- key, enter the setting recorded on the label on the pre-exposure lamp you have replaced, and press the AE key.

2) Record the setting you have entered under 'PREX_LP' on the service label.

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X. SELF DIAGNOSIS

The copier's DC controller PCB is equipped with a microprocessor that checks the state of the machine (sensors in particular); when it identifies an error, it indicates it in the copy counter on the control panel.

In the case of 'E001', 'E0' and '01' are flashed alternately.

Code	Cause	Description
C	Indicated when the fixing film is being corrected for displacement.	• After E007 The temperature detected by the thermistor (TH1) is 100°C or less at power-on.
CC	Indicated when the drum unit has reached its life (replacement).	• The cummulative number of copies made by the drum unit has reached 30,000.
H	Fixing heater (overheating)	• The thermistor (TH2) temperature exceeds 225°C during copying operation.
E000	• Thermistor (TH1, TH2; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melted) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature fails to reach 65°C 1.5 sec after a press on the Copy Start key. • The thermistor (TH1) temperature fails to reach 150°C in 4 sec after a press on the Copy Start key. • The thermistor (TH2) temperature fails to reach 65°C in 4 sec after a press on the Copy Start key. (Note 1)

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Code	Cause	Description
E001	• Thermistor (TH1, TH2; faulty) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature exceeds 245°C during copying operation. • The thermistor (TH1) temperature exceeds the control temperature by 30°C after a press on the Copy Start key. • The thermistor (TH2) temperature exceeds 275°C during copying operation. • The thermistor (TH1) detects a temperature increase of 100°C or more within 1 sec. • The thermistor (TH1) detects a temperature increase of 40°C or more during standby after it has reached 100°C. • The thermistor detects a temperature increase of 40°C after it has reached 130°C. (Note 1)
E002	• Thermistor (TH1; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melting) • Triac (faulty) • DC controller PCB (faulty)	• The temperature detected by the thermistor (TH1) has exceeded 150°C during copying operation and maximum power is applied for 10 to 14 sec thereafter. (Note 1)
E003	• Thermistor (TH1; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melting) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature exceeds 190°C during copying and then drops 170°C or less for 0.1 sec or more. (Note 1)
E007	• Fixing heater film (displaced, torn)	• The output of the fixing film displacement sensor (PS5; '1') continues 100 ms or more while the main motor (M1) is operating. • The fixing film cannot be corrected for displacement when fixing film displacement correction mode is executed at power-on.
E010	• Main motor (M1; faulty) • DC controller PCB (faulty)	• The revolution of the main motor deviates from the specification for 1 sec or more while the main motor drive signal (MMD=1) is being generated, i.e., remains MLOCK=0.
E030	• Counter (open circuit) • DC controller PCB (faulty)	• The counter drive signal is not '1' when the counter operater. • The counter drive signal is not '0' when the counter is at rest.

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Code	Cause	Description
E064	• Composite power supply PCB • DC controller PCB (faulty)	• The scanner does not leave the home position within 10 sec after it has started to move or the home position cannot be detected.
E210	• Lens home position sensor (faulty) • Scanner motor (faulty) • Lens cable • Scanner/lens drive switching mechanism (faulty) • DC controller PCB (faulty)	• The lens home position cannot be detected after the lens has traveled over its maximum distance. • The lens does not leave the lens home position. • A discrepancy is identified between the selected reproduction ratio and the lens position during copying operation.
E220	• Scanning lamp • Intensity sensor PCB (faulty) • DC controller PCB (faulty) • Composite power supply PCB (faulty)	• Intensity adjustment fails to end within 50 sec after the scanning lamp has turned on. • The scanning lamp remains on for 5 sec during standby. • The scanning lamp remains off for 5 sec during copying.
E240	• DC controller PCB (faulty) • Composite power supply (faulty)	• An error is detected in the communication between the DC controller PCB and the composite power supply PCB.
E261	• Power supply frequency (faulty) • Composite power supply PCB (faulty)	• The intervals in the zero-cross signals is greater than allowed.
E400	• Data communication with copier (faulty)	• The communication with the copier is interrupted for 5 sec or more; the communication is monitored at all times.
E803	• DC controller PCB (faulty) • Composite power supply PCB (faulty) • Scanning lamp (faulty)	• The +24V power supply deviates from the control value by ±20% during copying.
keys on control board locked	• Scanner home position sensor (PS1; faulty) • Scanner motor (M2; faulty) • DC controller PCB (faulty)	• The lens home position cannot be detected after the lens has traveled over its maximum distance. • The lens does not leave the lens home position.

Note:
If the self diagnosis mechanism has turned on, you can reset the machine by turning it off once. This, however, does not apply in the case of E000, E001, E002, or E003; to reset, perform the following:

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1. Starting Service Mode

1) Open the copier's top unit, and remove the two screws ①; then, remove the upper front cover ②.

Caution:

A flexible cable for the control panel is connected to the front upper cover; take care not to damage the cable.

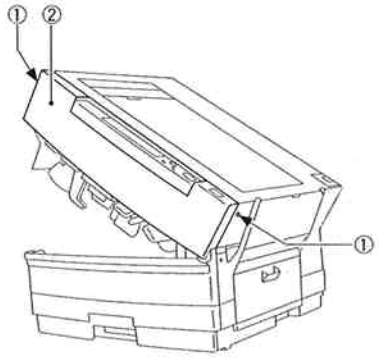

Figure 3-1001

2) Turn on the copier, and short the jumper wires JP3 and JP4 on the DC controller PCB with a screwdriver.
   - The count/ratio indicator on the control panel turns on 'F'.

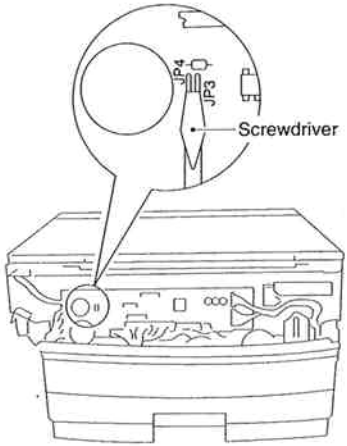

Figure 3-1002

3) When 'F' has turned on, stop shorting the jumper wires JP3 and JP4.
4) Turn off and then on the copier.

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CHAPTER 4

MECHANICAL SYSTEM

1. ⚠ Disconnect the power cord for safety before disassembly or reassembly work.
2. Group the screws by type (length and diameter) and location.
3. The fixing screw for the grounding wire and varistors is fitted with a washer to ensure electric continuity; be sure to use the washer for reassembly.
4. If possible, avoid operating the machine with any of its parts removed.

I. EXTERNALS 4-1
II. DRIVE SYSTEM 4-5
III. PICK-UP/FEEDING SYSTEM 4-22
IV. EXPOSURE SYSTEM 4-32
V. CHARGING SYSTEMS 4-37
VI. DEVELOPING ASSEMBLY 4-40
VII. FIXING SYSTEM 4-45
VIII. ELECTRICAL SYSTEM 4-50
IX. ADF 4-52

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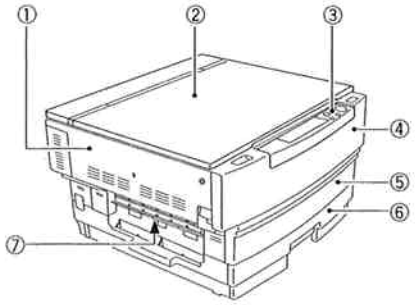
I. EXTERNALS

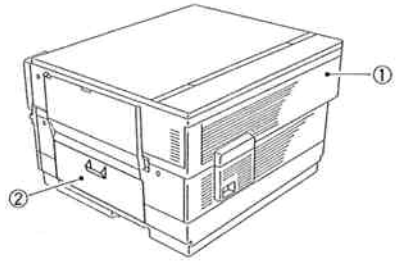
A. External Covers

For instructions on removing the ADF, see IX. "ADF."



① Top cover
② Copyboard cover
③ Control panel
④ Upper front cover
⑤ Lower front cover
⑥ Cassette
⑦ Left cover

Figure 4-101



① Rear cover
② Multifeeder unit

Figure 4-102

Caution:

Remove the covers as necessary to clean, check, or repair the inside of the machine.
Covers that may be detached by mere removal of the mounting screws are omitted from the discussions.

1. Removing the Top Cover

1) Remove the copyboard cover.
2) Open the copier's top unit.
3) Remove the two screws ①, and remove the front upper cover ②.

Caution:

The flexible cable for the control panel is connected to the front upper cover; disconnect the flexible cable from the DC controller.

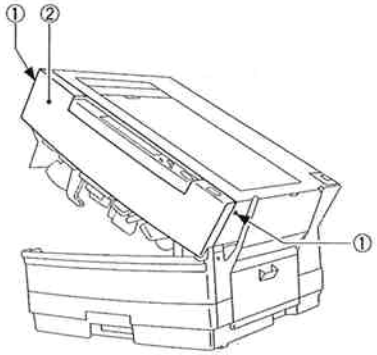


Figure 4-103

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4) Disengage the two claws ③, and slide the left cover ④ down to remove.

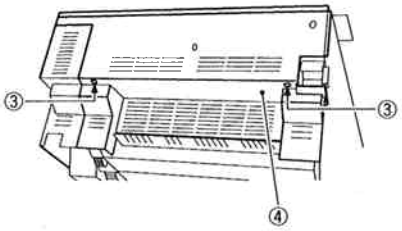

Figure 4-104

5) Remove the screw ⑤, and free the four claws ⑥; then, remove the rear cover ⑦.

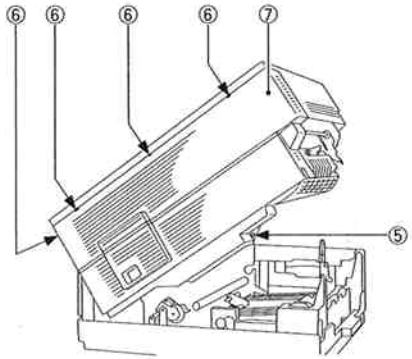

Figure 4-105

6) Remove the screw ⑧, and remove the copyboard cover support retainer ⑨.

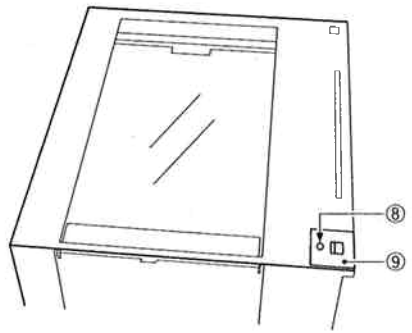

Figure 4-106

7) Lift the top cover ⑩ to remove.

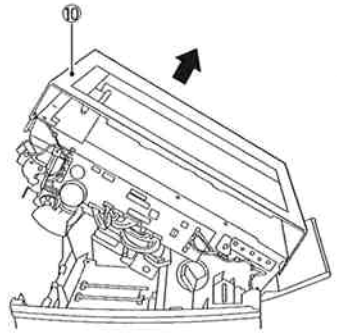

Figure 4-107

2. Removing the Front Lower Cover

1) Remove the top cover. (See "Removing the Top Cover")
2) Open the right cover ①, and remove the two screws ②; then, remove the multi-feeder feeder unit ③.

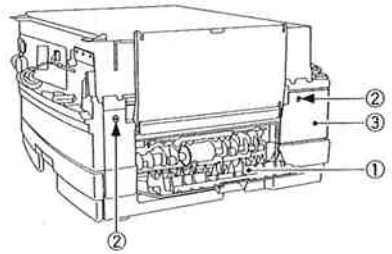

Figure 4-108

3) Remove the cassette.

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4) While disengaging the three claws ④, remove the lower front cover ⑤.

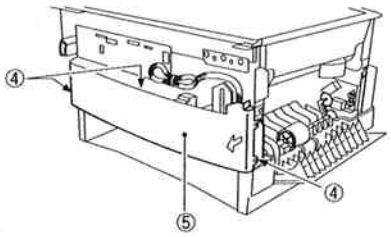

Figure 4-109

Caution:

When installing the multifeeder, go through the following steps:

1) Turn on the power switch, and select multifeeder mode; then, press the Copy Start key.
2) When the pick-up gear unit has risen to its topmost position, turn off the power switch.

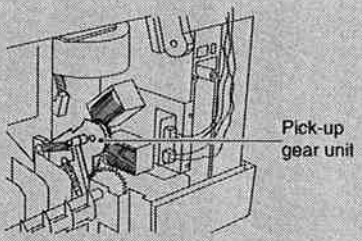

Figure 4-110

3) After installing the multifeeder unit, select multifeeder mode and make one copy.

B. Control Panel

For instructions on removing the ADF, see IX. "ADF."

1. Removing the Control Panel

1) Open the copier's top unit. (See "Removing the Top Cover")
2) Remove the two screws ①, and remove the front upper cover ②.

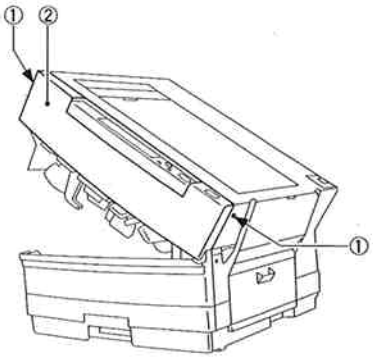

Figure 4-111

3) Disengage the claw ③, and remove the power switch PCB ④.

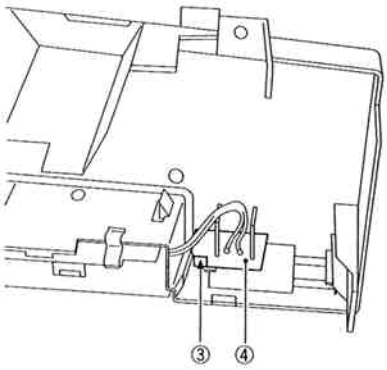

Figure 4-112

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4) Move the density adjusting lever ⑤ to the right; then, disengage the three claws ⑥, and remove the control panel ⑦.

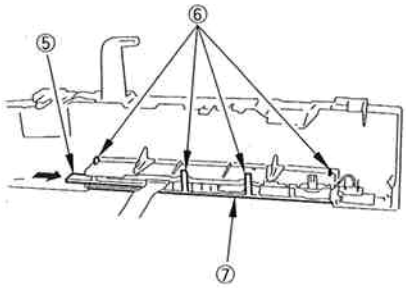

Figure 4-113

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II. DRIVE SYSTEM

A. Scanner Drive Assembly

For instructions on removing the ADF, see IX. "ADF."

1. Removing the Scanner Drive Motor

1) Remove the top cover. (See "Removing the Top Cover")
2) Loosen the two or three screws ①, and remove the copyboard glass ②.

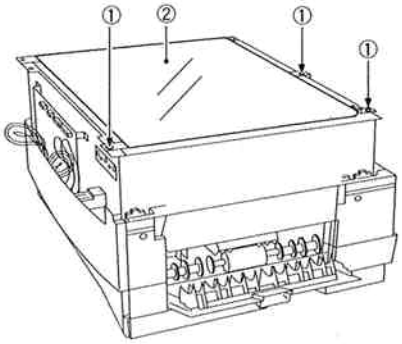

Figure 4-201

3) Remove the four screws ③, and remove the lens cover ④.

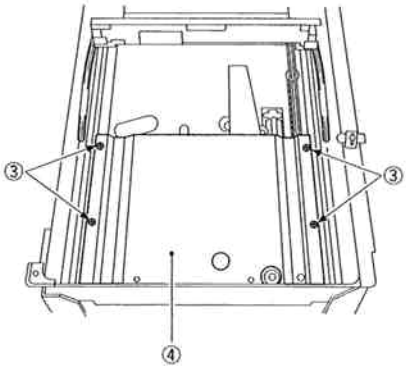

Figure 4-202

4) Remove the Front Lower Cover. (See "Removing the Front Lower Cover.")
5) If the copier came with an ADF as standard, open the upper frame unit, and remove the two screws ⑥ to remove the sub hinge mount ⑤.

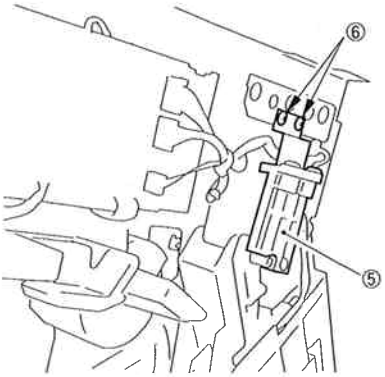

Figure 4-203

6) If the copier came with an ADF as standard, remove the spring ⑦.

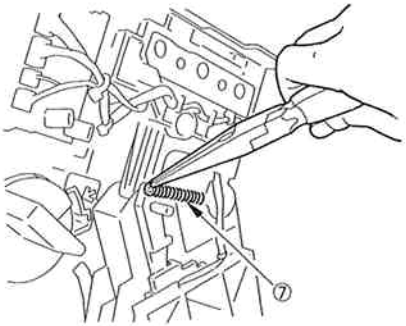

Figure 4-204

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7) Remove the Developing Assembly. (See "Removing the Developing Assembly.")
8) Open the copier's top unit further, and fix it in position using the grip of a screwdriver or the like (30 mm dia.).

Caution:
The top unit will jumpopen; keep a hand on the top while opening it.

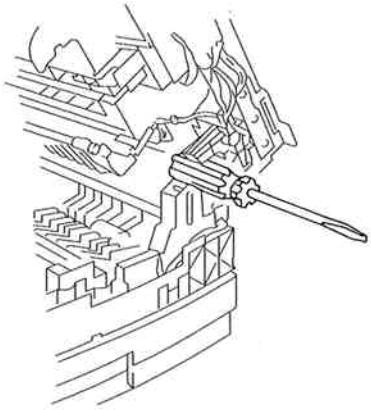

Figure 4-205

9) Remove the two fixing screws ⑧ for the scanner drive motor.

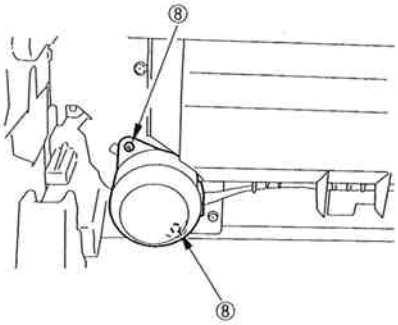

Figure 4-206

10) Free the copier's top unit by removing the screwdriver, and install the spring and the sub hinge mount, and close the upper frame unit.
11) Remove the E-ring ⑨, and lift the cable drive pulley ⑩ slightly to remove the scanner drive motor ⑪.

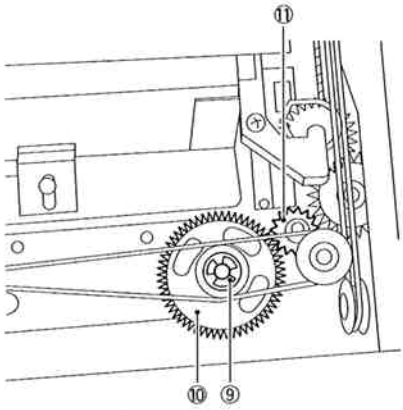

Figure 4-207

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2. Routing the Scanner Drive Cable

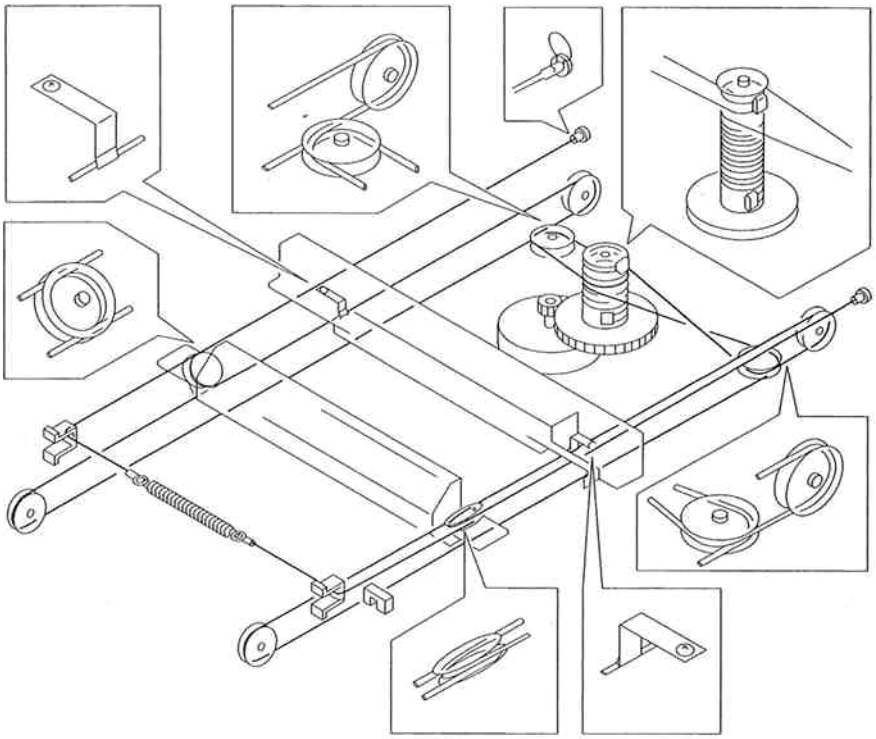

Figure 4-208

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3. Scanner drive wire attachment procedure

[1] Preparation

Prepare the following tools beforehand.

- Mirror positioning tool (FY9-3009)
- Wire clip (FY9-3017)
- Adhesive tape

1) Set the mirror positioning tool.

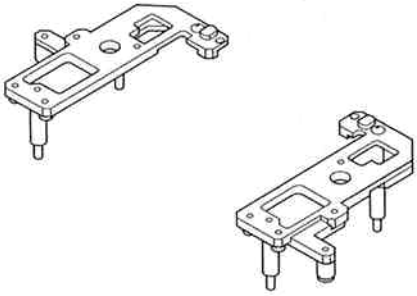

Figure 4-209

2) Prepare about five sheets of adhesive tape which are cut in approximately 20mm x 50mm size.
3) Remove the copyboard cover.
4) Remove the upper cover.
5) Remove the copyboard glass.
6) Remove the sensor cable ① and three screws ② and remove the cross member ③.

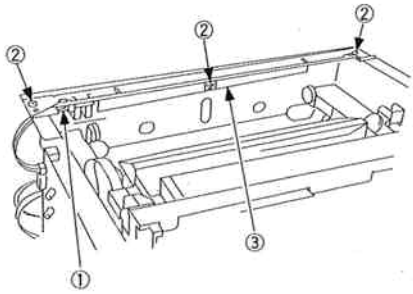

Figure 4-210

7) Remove the four screws ④ and the lens cover ⑤.

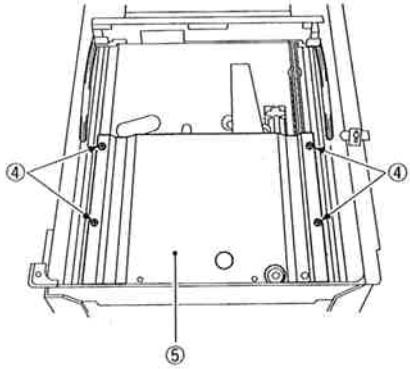

Figure 4-211

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[2] Attach the backing wire.

1) Wind the backing wire (silver) ② on the wire drive pulley ① 7.5 times so that the longer side comes to the top and secure it using wire the clip ③.

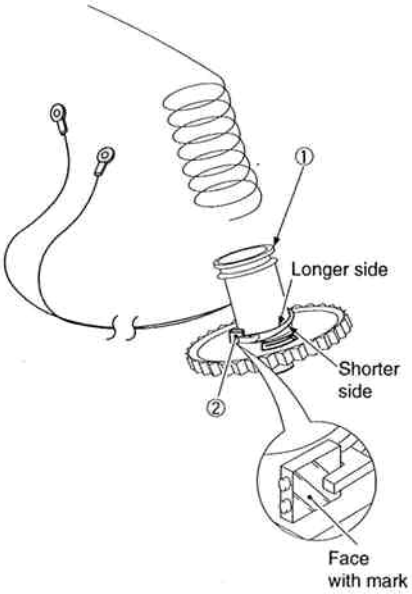

Figure 4-212

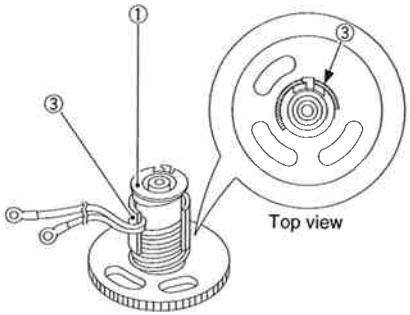

Figure 4-213

2) Place the wire drive pulley ① on the shaft ④ and secure it using an E ring ⑤. When placing the wire drive pulley on the shaft, orient the hook section to the front side.

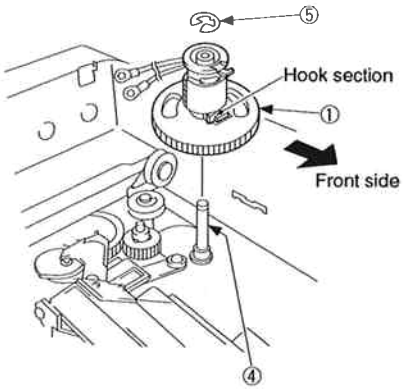

Figure 4-214

3) Hook the shorter side of the wire ⑥ on the pulley ⑦ on the right rear side.

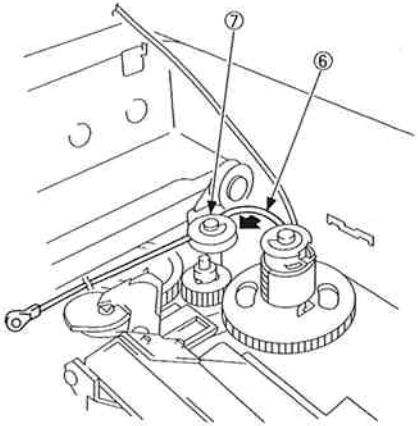

Figure 4-215

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4) Put the shorter side of the wire ⑥ through under mirror 1 mount ⑧ and the mirror 2 and 3 mount ⑨, then hook it on the pulley ⑩ at the left rear side and pulley ⑪ of the mirror 2 and 3 mount.

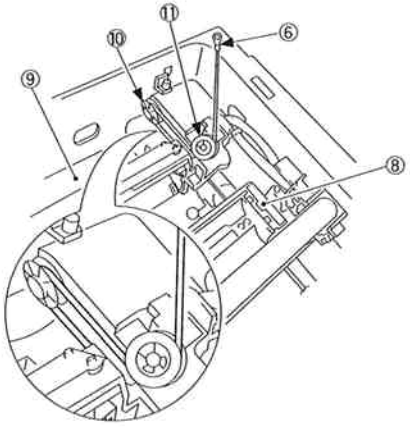

Figure 4-216

5) After hooking the shorter side of the wire ⑥ on the wire hook ⑫, use adhesive tape ⑬ to secure the rear end of the wire on the left side face. Arrange the securing position of the wire so that, as shown in the Figure below, the rear end of the wire comes to the position against the hole on the left side face.

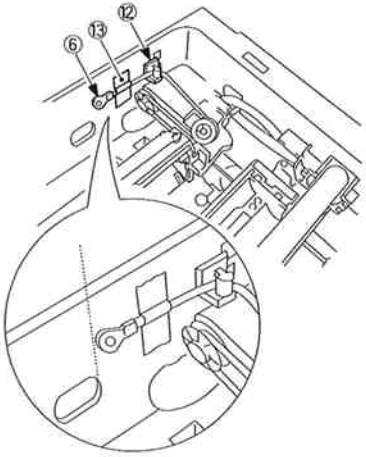

Figure 4-217

6) Hook the longer side of the wire ⑭ on the pulley ⑮ at the right hand front side as shown in the Figure below by routing it along the wire drive pulley ①.

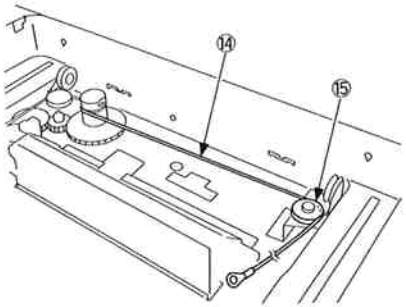

Figure 4-218

7) Put the longer side of the wire ⑭ throught under mirror 1 mount ⑧ and mirror 2 and 3 mount ⑨, then hook it on the pulley ⑯ at the left hand front side and pulley ⑰ of mirror 2 and 3 mount.

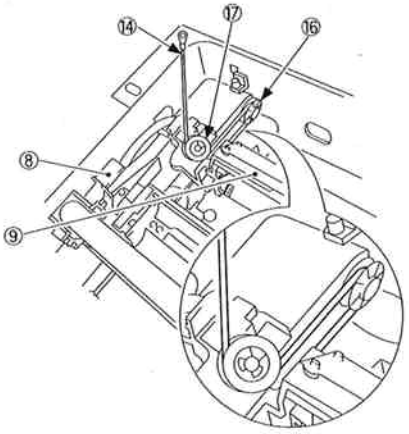

Figure 4-219

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8) After hooking the longer side of the wire ⑭ on the wire hook ⑱, use adhesive tape ⑲ to secure the rear end of the wire on the left side face. Arrange the securing position of the wire so that the rear end of the wire comes to the position as shown in the Figure below against the hole on the left side face.

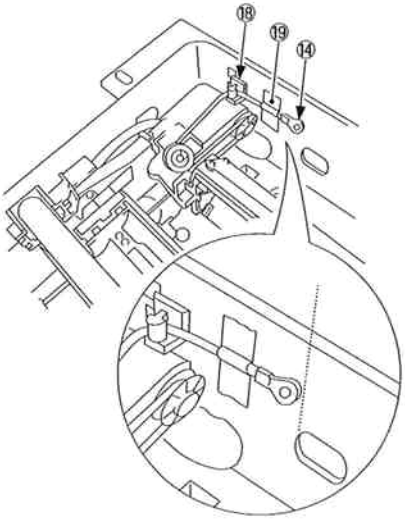

Figure 4-220

[3] Attaching forward wire

1) Wind the forward wire (black) ② on the upper side hook ① wire drive pulley 1.5 times so that the longer side comes to the top, then, secure the shorter side of the wire ③ as shown in the figure below using adhesive tape ④.

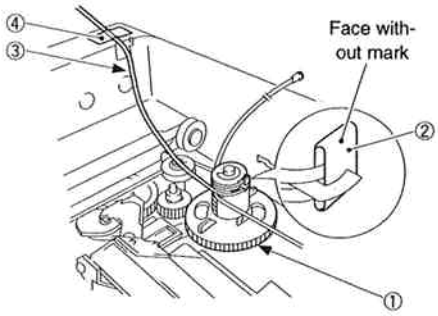

Figure 4-221

2) Route the longer side of wire ⑤ along the wire drive pulley and hook it on the pulley ⑥ at the right hand front side as shown in the figure below.

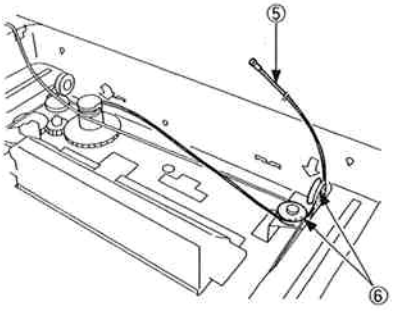

Figure 4-222

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3) Furthermore, put the longer side of wire ⑤ through under mirror 1 mount ⑦ and hook it on the pulley ⑧ of mirror 2 and 3 mount as shown in the figure below.

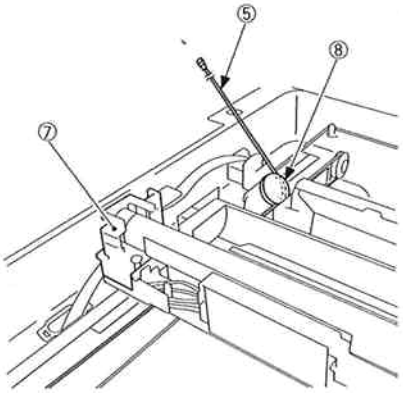

Figure 4-223

4) After hooking the longer side of wire ⑤ on the pulley ⑧ of mirror 2 and 3 mount, route it through between mirror 1 mount ⑦ and scanning lamp ⑨.

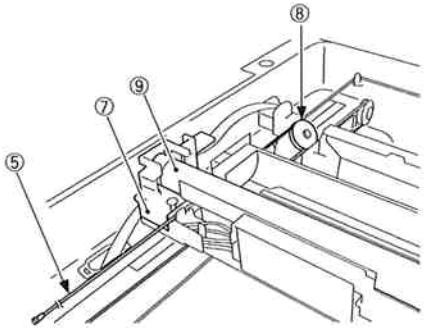

Figure 4-224

5) Fish the rear end of the longer side of wire ⑤ through the hole ⑪ at the right side face.

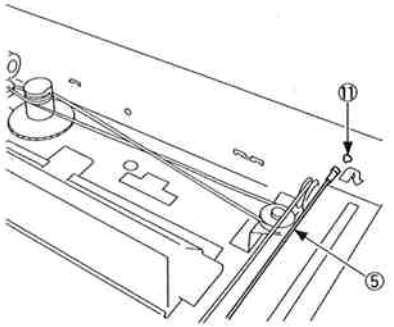

Figure 4-225

6) Remove the fixing for the shorter side of the wire ③ and hook the wire on the pulley ⑫ at the right rear side as shown in the figure below.

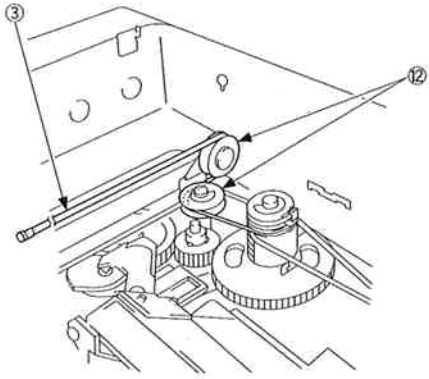

Figure 4-226

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7) Put the shorter side of the wire ③ under mirror 1 mount ⑥, then hook it on the pulley ⑫ of mirror 2 and 3 mount as shown in the figure below.

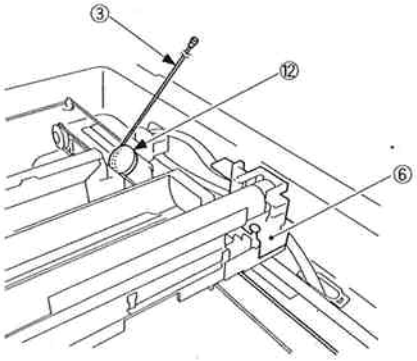

Figure 4-227

8) After hooking the shorter side of the wire ③ on the pulley ⑫ of mirror 2 and 3 mount, fish it between mirror 1 mount ⑦ and the scanning lamp ⑨.

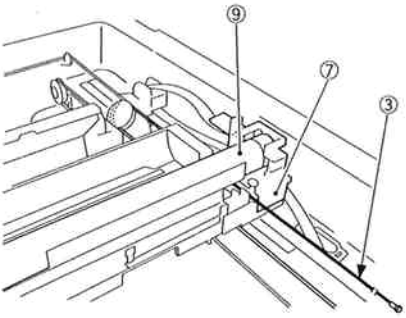

Figure 4-228

9) Fish the rear end of the shorter side of the wire ③ through the hole ⑬ at the right side face.

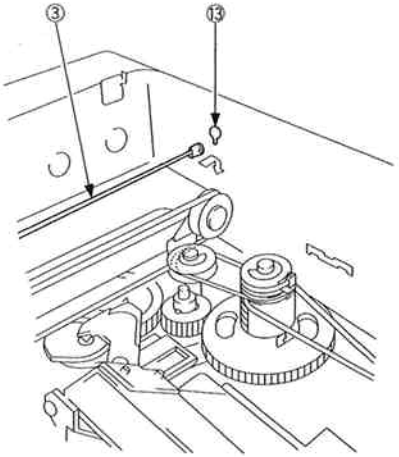

Figure 4-229

10) Remove the fixing for the shorter side ③ and longer side ⑤ of the backing wire and connect both using the spring ⑭.

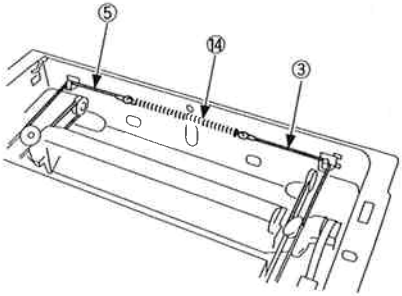

Figure 4-230

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11) Remove the pulley clip ⑮ attached to the wire driver pulley ①.

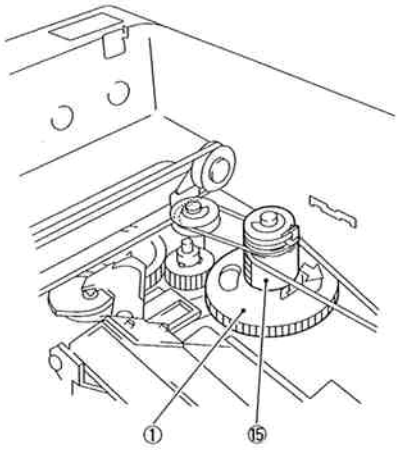

Figure 4-231

[4] Positioning of mirror 1 mount

1) Temporary secure the rear side and front side of mirror 1 mount ① on the fitting ② of the backing wire.

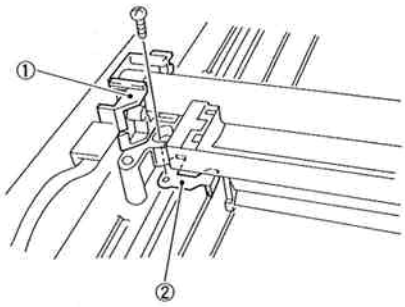

Figure 4-232 (Rear side)

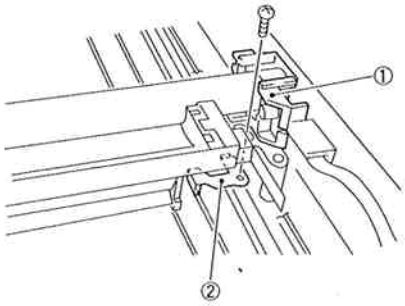

Figure 4-233 (Front side)

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2) Rotate the wire drive pulley ④ so that the three pins ③ of the mirror positioning tool for the rear and front side become accommodated in the position shown in the figure below.

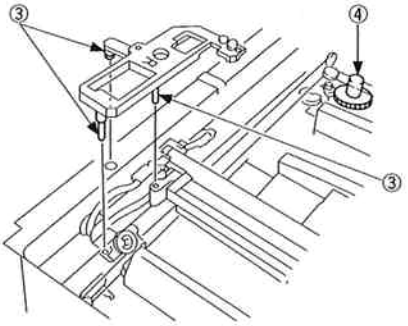

Figure 4-234 (Rear side)

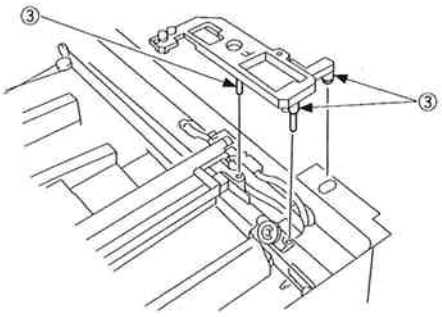

Figure 4-235 (Front side)

3) Tighten the positioning screw at the rear side and front side of mirror 1 mount ①.

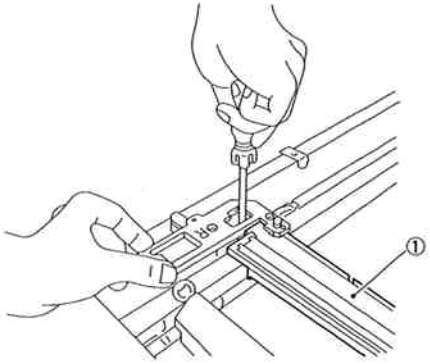

Figure 4-236 (Rear side)

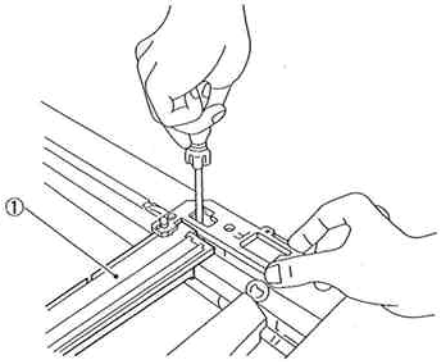

Figure 4-237 (Front side)

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B. Lens Drive Assembly

For instructions on removing the ADF, see IX. "ADF."

1. Removing the Lens Cable

1) Select DIRECT mode, and disconnect the power plug.
2) Remove the copyboard cover.
3) Remove the top cover. (See "Removing the Top Cover")
4) Remove the main drive assembly. (See "2. Removing the Main Drive Assembly.")
5) Remove the four screws ①, and remove the lens cover ②.

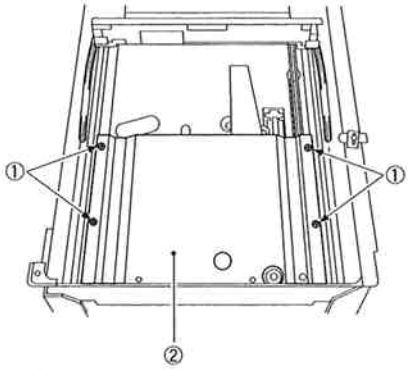

Figure 4-238

6) Put a marking ⑤ on the lens cable fixing plate ③ and the lens mount ④.

Caution:

During assembly, make sure that the lens cable fixing plate and the lens mount are positioned with reference to the markings.

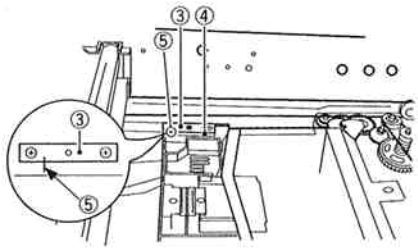

Figure 4-239

7) Disengage the No. 4/5 mirror mount ⑥ and the cam ⑦.

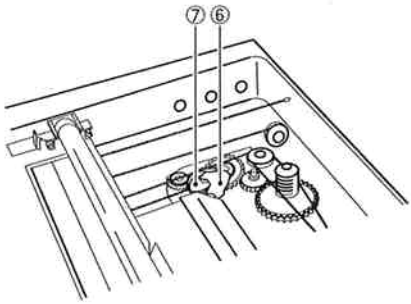

Figure 4-240

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8) Remove the screw ⑧, and remove the cam gear ⑨.

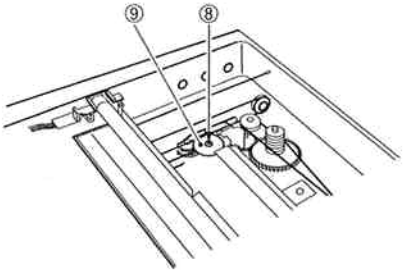

Figure 4-241

9) Remove the spring ⑪ from the tensioner ⑩.

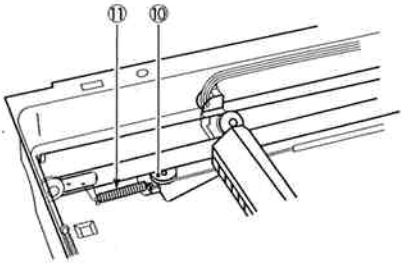

Figure 4-242

10) Remove the screw ⑫, and remove the lens cable fixing plate ③.

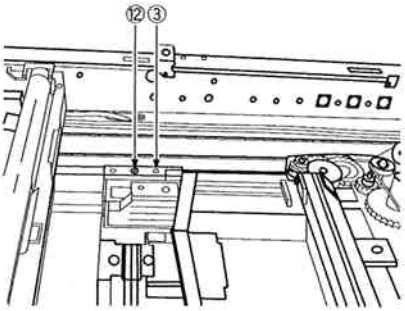

Figure 4-243

11) Remove the lens cable from the lens cable ⑬ fixing plate ③; then, pull out the lens cable.

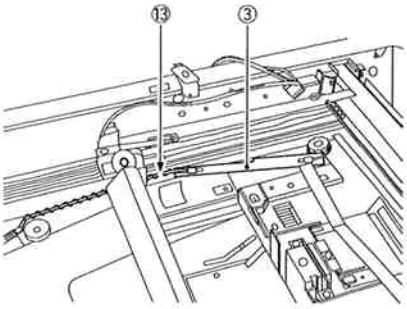

Figure 4-244

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2. Installing the Lens Cable

1) After installing the lens cable, keep the detecting lever ① of the No. 4/5 mirror mount off the cam gear ② so that the cam gear will not come into contact with the detecting lever when it rotates.

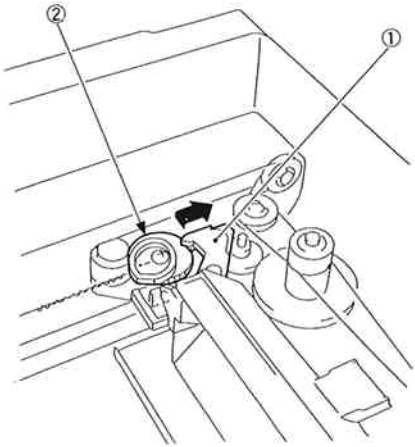

Figure 4-245

2) While keeping the condition created in step 1), turn on the power; then, turn off the power when the No. 1 mirror mount and the lens have stopped to operate.
   - The No. 1 mirror mount moves to the home position and the lens will shift to the DIRECT position.

3) Engage the detecting lever of the No. 4/5 mirror mount with the cam gear, and make sure that the tip ③ of the detecting lever and the marking line ④ on the top face of the cam gear match.

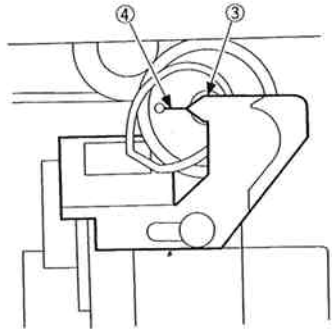

Figure 4-246

4) If the tip of the detecting lever and the marking line on the top face of the gear do not match, remove the fixing screw ⑤ of the cam gear, and change the tooth engagement of the cam gear ② until the tip and the marking line match.

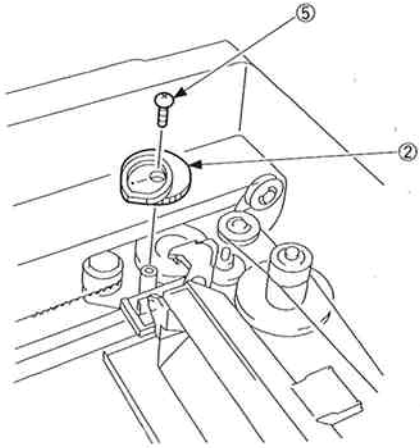

Figure 4-247

5) Engage the detecting lever of the No. 4/5 mirror mount with the cam gear.

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C. Main Motor/Main Drive Assembly

For instructions on removing the ADF, see IX. "ADF."

1. Removing the Main Motor Unit

1) Remove the drum unit.
2) Remove the top cover. (See "Removing the Top Cover")
3) Disconnect the 13 connectors ② from the composite power supply PCB ①.

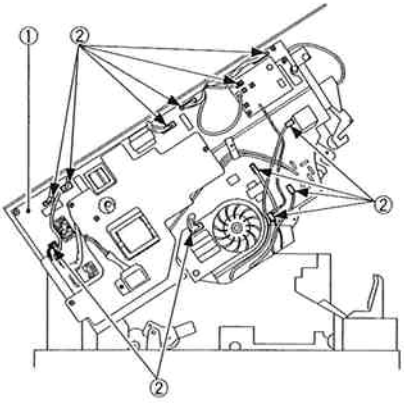

Figure 4-248

4) Remove the screw ③, and remove the top high-voltage terminal unit ④.

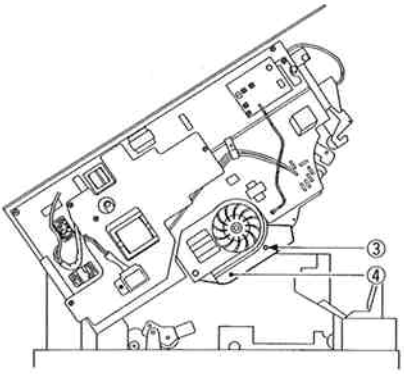

Figure 4-249

5) Remove the seven screws ⑤; then, while disengaging the claw ⑥, remove the composite power supply PCB ①.

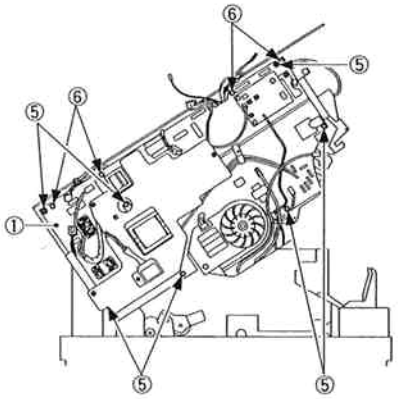

Figure 4-250

6) Remove the insulating sheet ⑦.

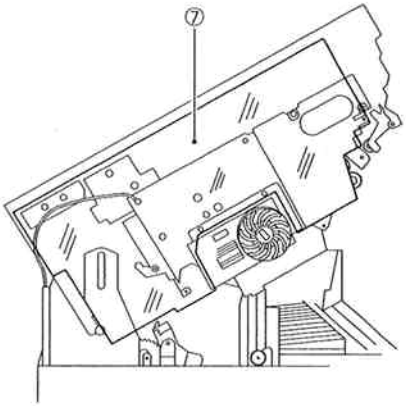

Figure 4-251

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7) Remove the four screws ⑧, and remove the main motor unit ⑨.

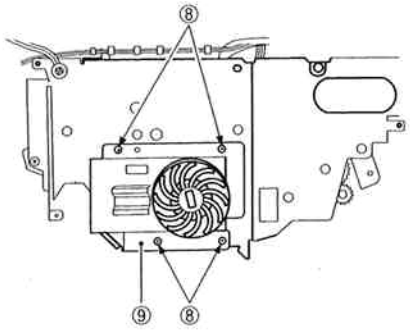

Figure 4-252

Caution:

When installing the main motor unit, be sure to attach the fan belt.
After attaching the fan belt, make sure that the belt is free of twists.

2. Removing the Main Drive Assembly

1) Remove the drum unit.
2) Remove the top cover.
3) Disconnect the 13 connectors ② from the composite power supply PCB ①.

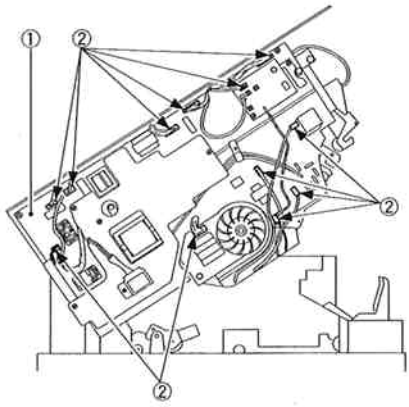

Figure 4-253

4) Remove the screw ③, and remove the high-voltage terminal unit ④.

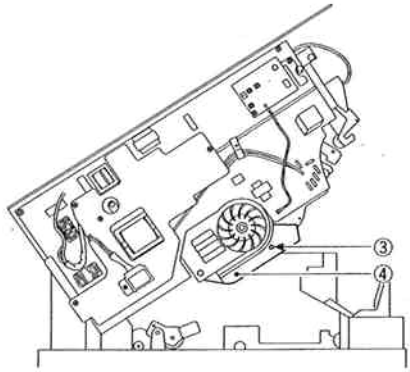

Figure 4-254

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5) Remove the seven screws ⑤; then, while disengaging the claw ⑥, remove the composite power supply PCB ①.

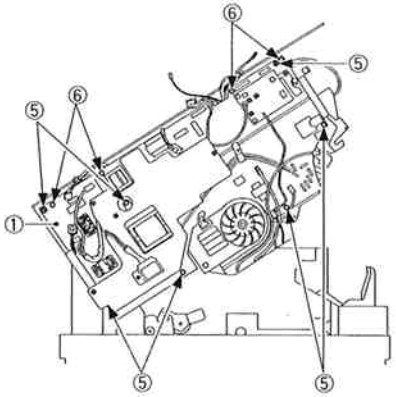

Figure 4-255

6) Remove the insulating sheet ⑦.

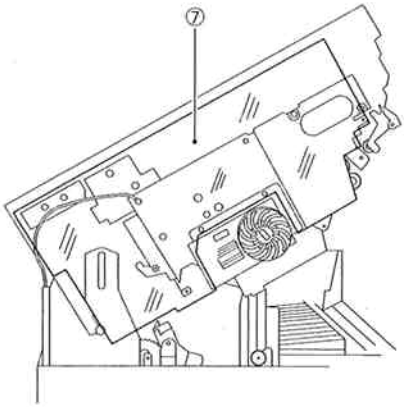

Figure 4-256

7) Remove the screw ⑧, and remove the grounding wire ⑨.

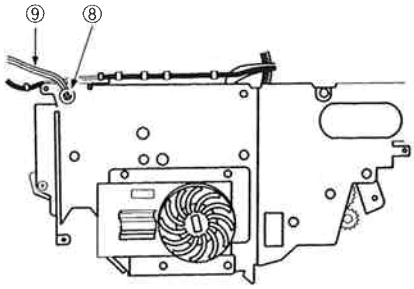

Figure 4-257

8) Remove the three screws ⑩, and remove the main drive assembly ⑪.

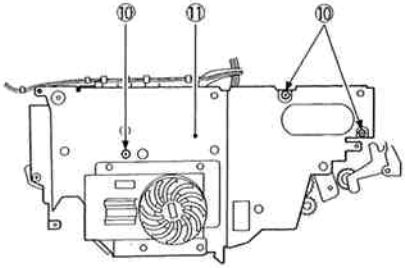

Figure 4-258

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III. PICK-UP/FEEDING SYSTEM

A. Pick-Up Assembly

1. Cassette Pick-Up Roller Unit

1) Remove the cassette.
2) Open the right door, and remove the two screws ①; then, remove the multifeeder unit ②.

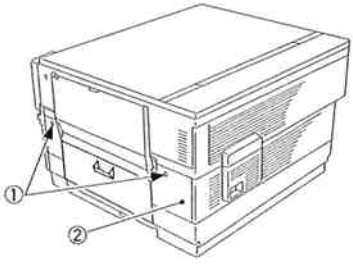

Figure 4-301

3) Remove the spacer ③.

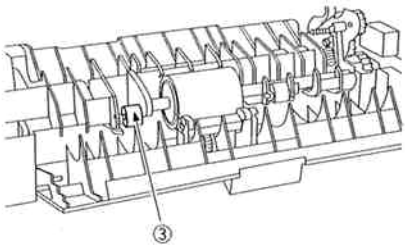

Figure 4-302

4) While pushing down the shaft retainer ④, move the cassette pick-up roller shaft ⑤ toward the front.

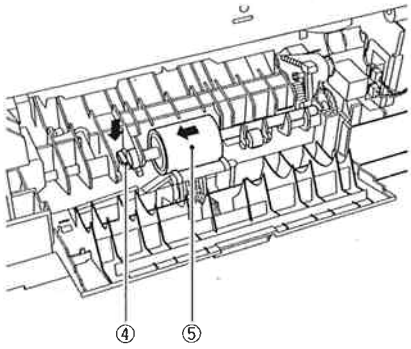

Figure 4-303

5) While removing the bushing ⑥, remove the cassette pick-up roller unit ⑦.

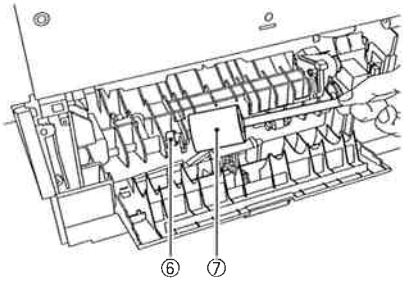

Figure 4-304

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Caution:

When installing the multifeeder unit, go through the following steps:

1) Turn on the power switch, and select multifeeder mode; then, press the Copy Start key.
2) When the pick-up gear unit has risen to its topmost position, turn off the power switch.

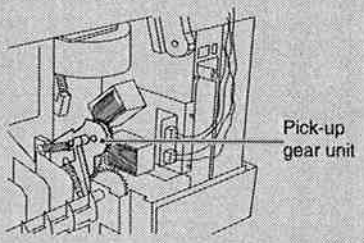

Figure 4-305

3) After installing the multifeeder unit, select multifeeder mode and make one copy.

2. Removing the Pick-Up Roller

1) Remove the pick-up roller unit. (See "1. Cassette Pick-Up Roller Unit.")
2) Remove the stop ring (plastic) ①, and pull out the pick-up roller.

Caution:

Take care not to lose the pin at the rear.

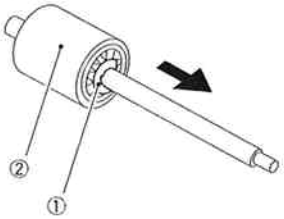

Figure 4-306

3. Removing the Pick-Up Clutch

1) Remove the top cover. (See "Removing the Top Cover.")
2) Remove the front lower cover. (See "Removing the Front Lower Cover.")

Caution:

The top unit will jumpopen; keep a hand on the top while opening it.

3) If the copier came with an ADF as standard, open the upper frame unit, and remove the two screws ② to remove the sub hinge mount ①.

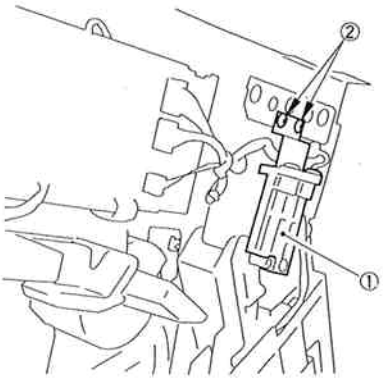

Figure 4-307

4) If the copier came with an ADF as standard, remove the spring ③.

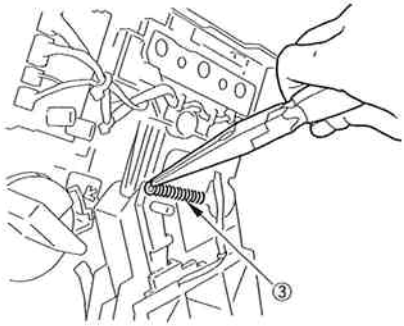

Figure 4-308

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5) Open the copier's top unit; and fix it in position using the grip of the screwdriver (about 30 mm dia.).

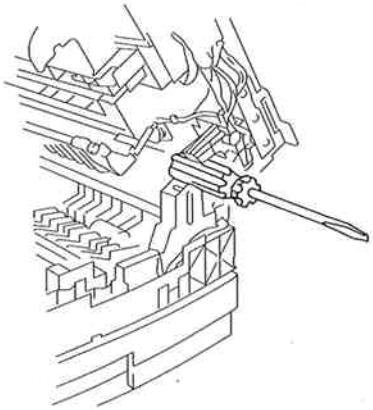

Figure 4-309

6) Remove the feed roller ④ and the spring ⑤; then, remove the transfer mount unit ⑥ and the high-voltage terminal unit ⑦)

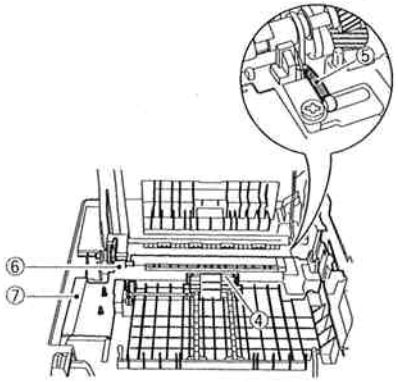

Figure 4-310

7) Remove the springs ⑧ and ⑨.

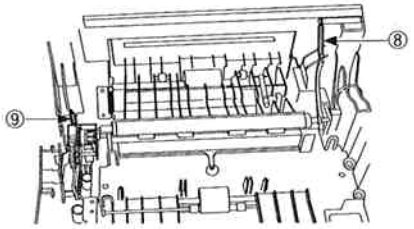

Figure 4-311

8) Remove the springs ⑪ and ⑫; then, while extending the bushing ⑬, remove the registration roller unit ⑩.

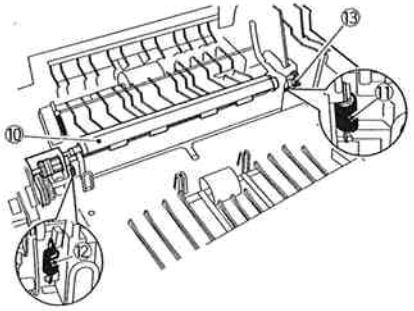

Figure 4-312

9) Disconnect the two connectors ⑭, and remove the screw ⑮; then, remove the solenoid ⑯.

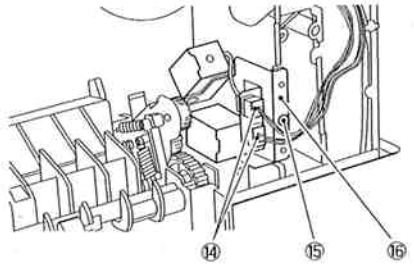

Figure 4-313

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10) While extending the bushing ⑰, remove the pick-up clutch unit ⑱.

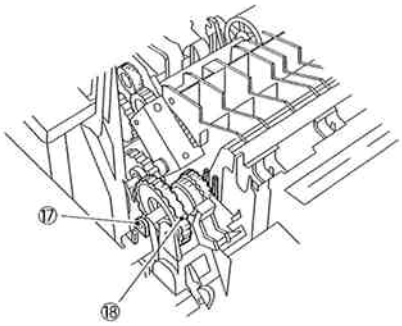

Figure 4-314

11) Remove the E-ring ⑲ and the washer ⑳; then, pull out the pick-up clutch ㉑.

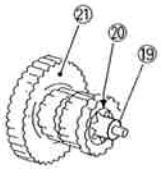

Figure 4-315

B. Multifeeder Assembly

1. Removing the Multifeeder Assembly

1) Open the right door.
2) Remove the two screws ①, and remove the multifeeder assembly ②.

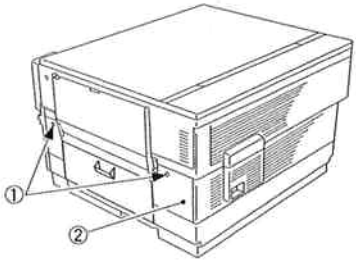

Figure 4-316

2. Removing the Multifeeder Pick-Up Roller

1) Remove the multifeeder assembly. (See "1. Removing the Multifeeder Assembly.")
2) Remove the bushing ① and the gear ② while disengaging the claw ③.

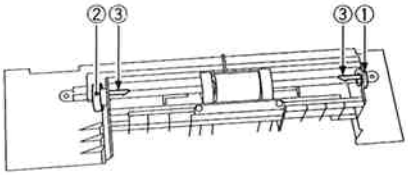

Figure 4-317

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3) Remove the multifeeder pick-up roller unit ④.

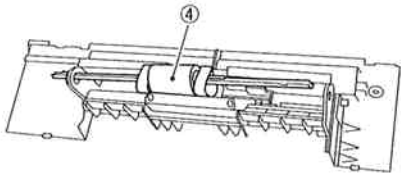

Figure 4-318

4) While disengaging the claw ⑤, pull out the multifeeder pick-up roller.

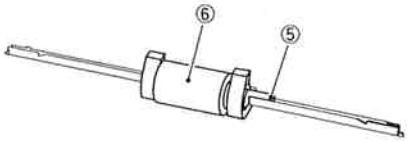

Figure 4-319

3. Removing the Separation Pad

1) Remove the multifeeder pick-up roller shaft. (See "1. Removing the Multifeeder Roller.")
2) Remove the pick-up tray.
3) Remove the stopper ① by disengaging the claw ②.

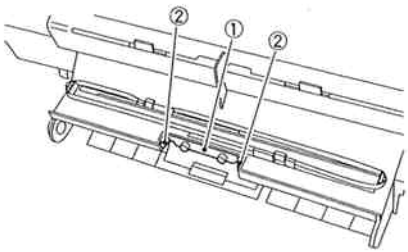

Figure 4-320

4) Push up the holding plate ③; then, move it toward the rear to remove.

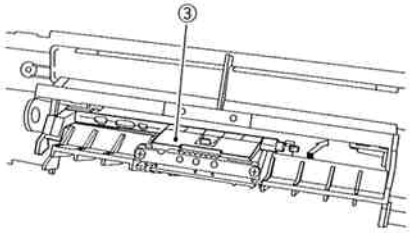

Figure 4-321

5) Push up the separation pad ④; then, pull it out while pushing the shaft ⑤ toward the inside.

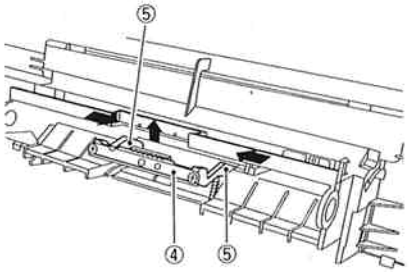

Figure 4-322

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C. Feeding Assembly

1. Detaching the Feeding Belt

1) Open the copier's top unit.
2) Push down the stopper ①, and remove the gear ②.

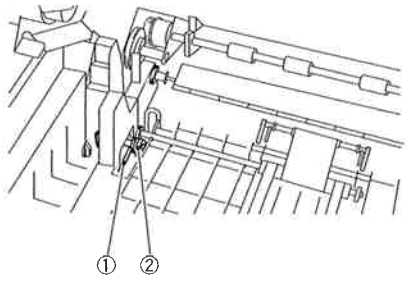

Figure 4-323

3) Remove the bushing ③, and remove each roller ④ and detach the feeding belt ⑤.

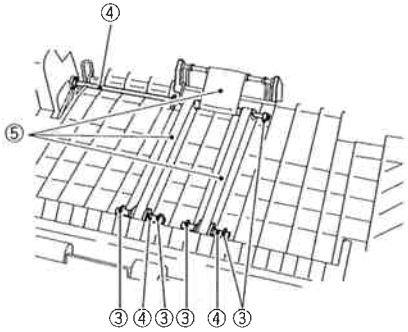

Figure 4-324

D. Registration Roller

1. Removing the Pick-Up Clutch

1) Remove the top cover. (See "Removing the Top Cover.")
2) Remove the front lower cover. (See "Removing the Front Lower Cover.")

Caution:
The top unit will jumpopen; keep a hand on the top while opening it.

3) If the copier came with an ADF as standard, open the upper frame unit, and remove the two screws ② to remove the sub hinge mount ①.

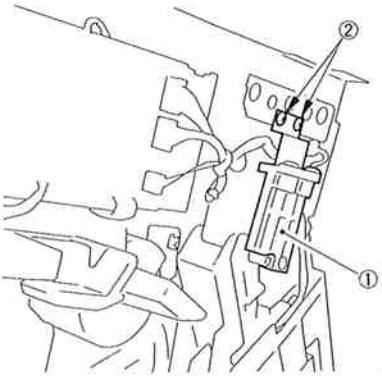

Figure 4-325

4) If the copier came with an ADF as standard, remove the spring ③.

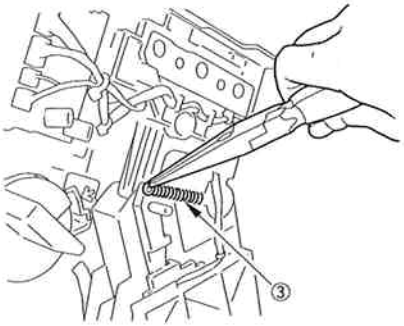

Figure 4-326

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5) Open the copier's top unit; and fix it in position using the grip of the screwdriver (about 30 mm dia.).

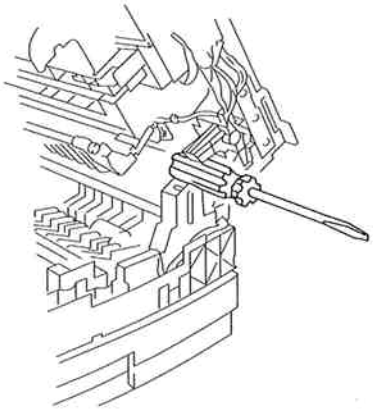

Figure 4-327

6) Remove the feed roller ④ and the spring ⑤; then, remove the transfer mount unit ⑥ and the high-voltage terminal unit ⑦)

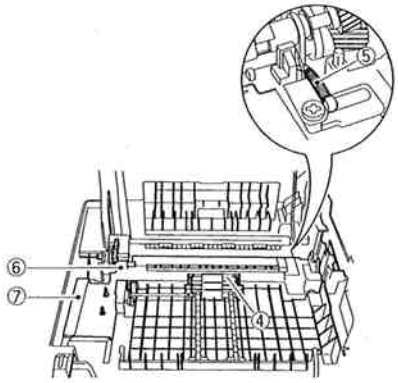

Figure 4-328

7) Remove the springs ⑧ and ⑨.

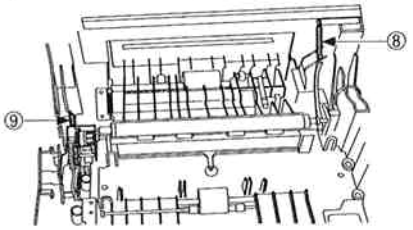

Figure 4-329

8) Remove the springs ⑪ and ⑫; then, while extending the bushing ⑬, remove the registration roller unit ⑩.

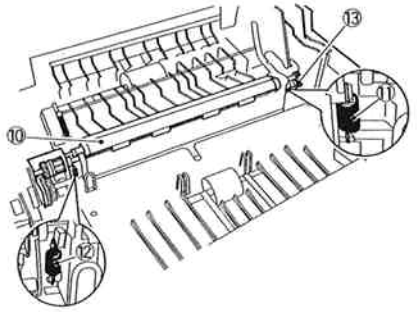

Figure 4-330

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2. Removing the Registration Roller Clutch

1) Remove the registration roller unit. (See "1. Removing the Pick-Up Clutch.")
2) Remove the E-ring ① ; then, remove the gear ② and the arm ③.

Caution

Take care not to drop the pin from the rear of the gear.

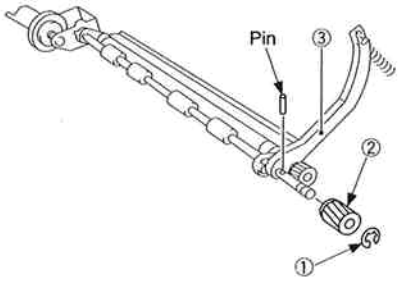

Figure 4-331

3) Remove the E-ring ④.

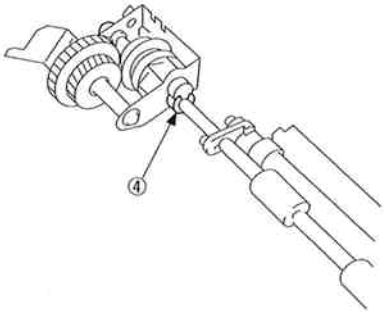

Figure 4-332

4) Remove the two bushes ⑤.

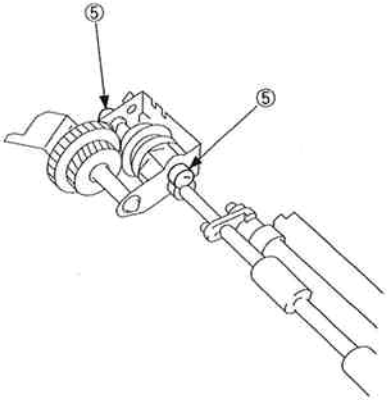

Figure 4-333

5) While moving down the registration roller ⑥, detach it from the gear unit ⑦.

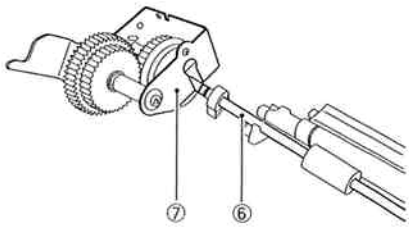

Figure 4-334

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6) Remove the E-ring ⑧, and pull out the clutch ⑨.

Caution:
Take care not to lose the pin from the rear of the clutch.

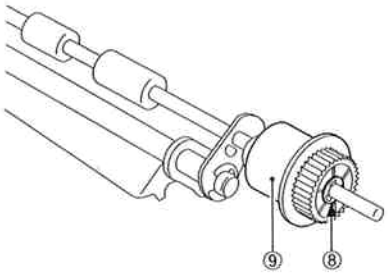

Figure 4-335

E. Delivery Assembly

1. Removing the Delivery Roller

1) Open the copier's top unit.
2) Remove the screw ①, and remove the noise filter PCB cover ②.

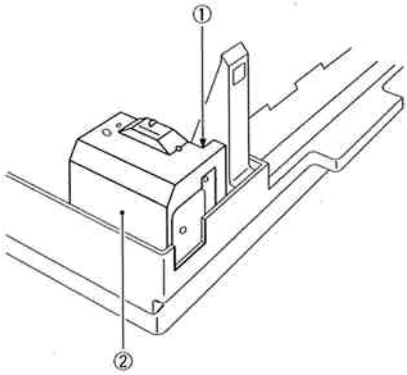

Figure 4-336

3) Push the claws ③, and shift the delivery roller gear unit ④.

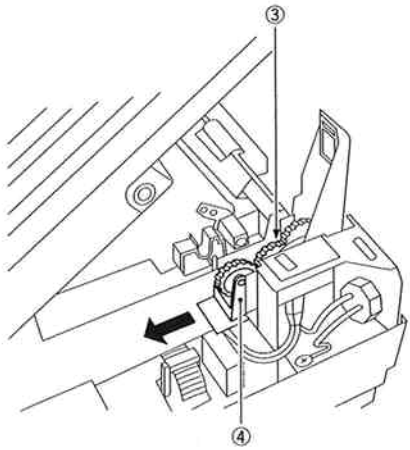

Figure 4-337

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4) Remove the delivery roller ⑤.

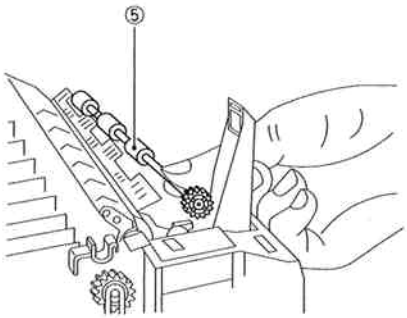

Figure 4-338

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IV. EXPOSURE SYSTEM

A. Illuminating Assembly

1. Removing the Scanning Lamp

1) Disconnect the power plug.
2) Remove the top cover.
3) Remove the copyboard glass.
4) Hook fingers on both ends of the scanning lamp ①, and remove the lamp while rotating it.

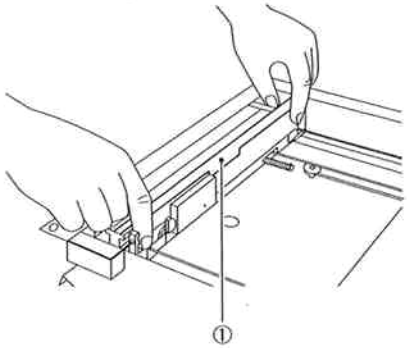

Figure 4-401

2. Installing the Scanning Lamp

Install the scanning lamp so that the light-emitting portion (transparent glass) is on the left when viewed from the front of the copier.

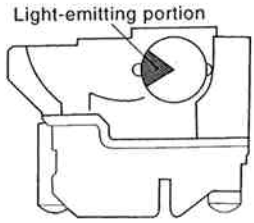

Figure 4-402 (front view)

1) Remove the two screws ①, and remove the multifeeder unit ②.

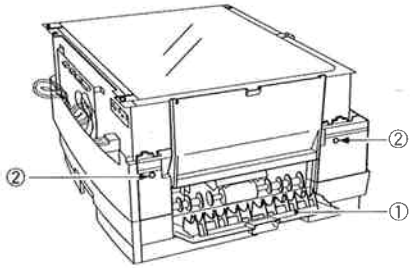

Figure 4-403

2) Turn the flywheel ③ of the scanner motor, and move the No. 1 mirror mount ④ so that it is nearly at the center.

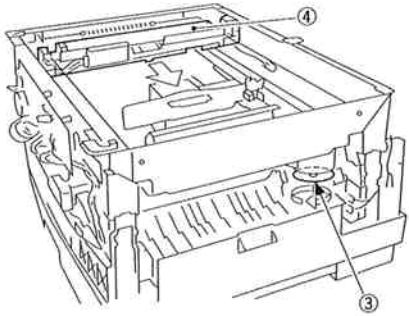

Figure 4-404

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3) Install the scanning lamp ⑤ with its manufacturer's marking ⑥ toward the front. Then, make sure that the contacts of the lamp are in firm contact with the contacts of the No. 1 mirror mount.

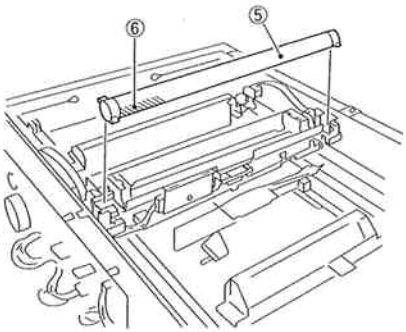

Figure 4-405

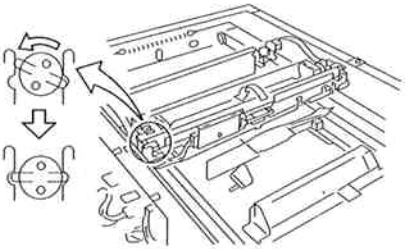

Figure 4-406

4) After installing the scanning lamp, push the four corners of the No. 1 mirror mount ④ lightly to make sure that the slider is in contact.

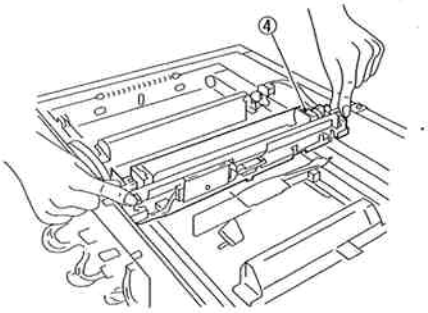

Figure 4-407

5) If the slider is not in firm contact, try the steps to install the scanning lamp once again.

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3. Removing the Scanning Lamp Heater

Caution:
The scanning lamp heater may be hot. Wait about 5 to 6 min after disconnecting the power plug.

Before Work
- Adhesive Tape

1) Disconnect the power plug.
2) Cut the adhesive tape to about 50 x 50 mm; prepare two strips.
3) Remove the top cover.
4) Remove the copyboard glass.
5) Remove the scanning lamp.
6) Remove the screw ①, and remove the heater plate ②.

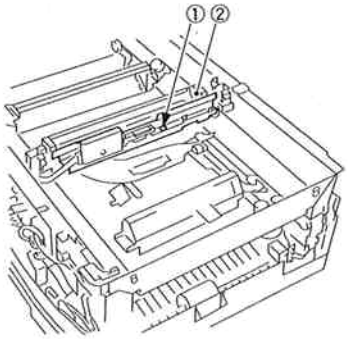

Figure 4-408

7) Disengage the rear ③ and the front ④ of the scanning cable from the hook ⑤; then, fix it in place while keeping the wire tension loose using the strips of adhesive tape ⑥.

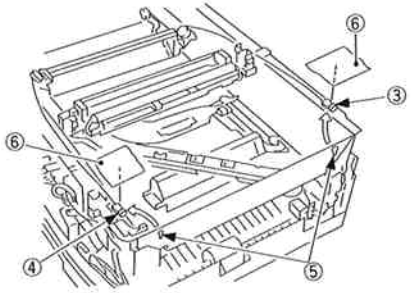

Figure 4-409

8) Disconnect the connector ⑧ from the back of the No. 1 mirror mount ⑦, and remove the scanning lamp ⑨.

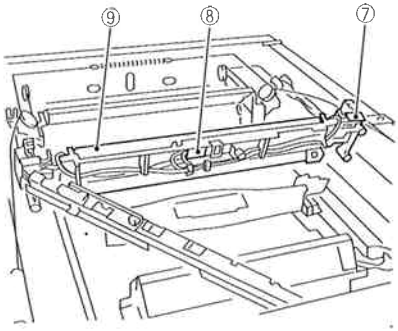

Figure 4-410

Caution:
The scanning lamp heater may be for either 115 V or 220/240 V. Be sure to select the one that suits the copier's voltage rating.
To identify, refer to the color of the cable and the rating marked on the connector; if blue, for 115 V; if black, for 220/240 V.

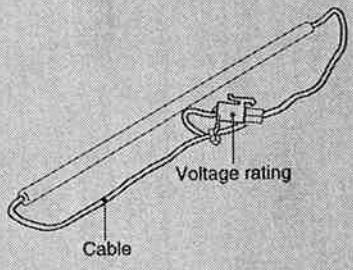

Figure 4-411

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4. Removing the Blanking Unit

1) Select enlargement mode (141%).
   - Turn on the power switch, and select 141%.
   - Press the Copy Start key.
   - When the lens has moved farthest left, turn off the power.
     Turn off the power, and disconnect the power plug.
2) Remove the multifeeder assembly.
3) Remove the cartridge.
4) Remove the top cover.
5) Remove the DC controller PCB.
6) Remove the two screws ② from the rear of the composite power supply PCB ①.

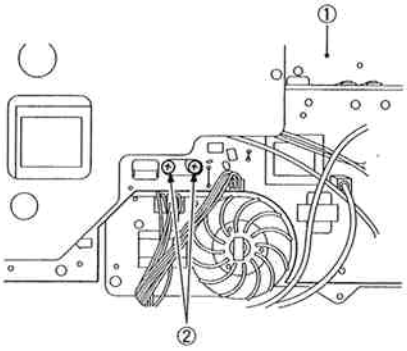

Figure 4-412

7) Open the copier's top unit, and remove the four screws ③; then, remove the blanking unit ④.

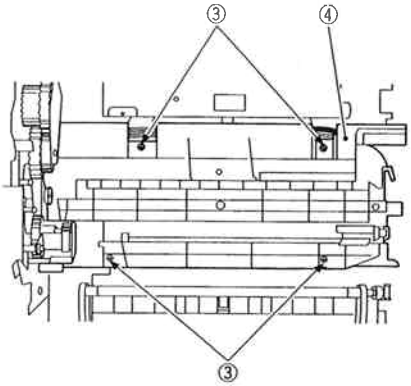

Figure 4-413

Caution:

When installing the blanking unit, make sure that the blanking unit PCB is farthest to both ends and the copier's lens is at the farthest left.

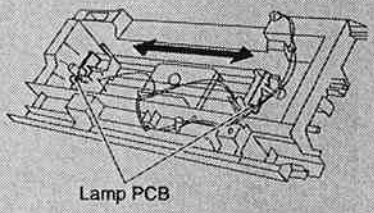

Figure 4-414

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5. Removing the Pre-Exposure Lamp PCB Unit

1) Remove the drum unit.
2) Disengage the two claws ①, and remove the pre-exposure lamp unit ②.

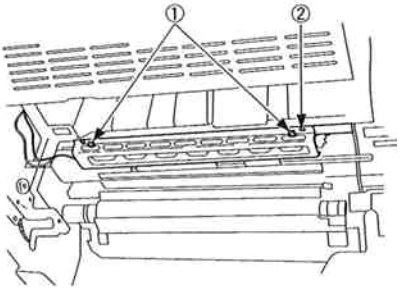

Figure 4-415

3) Remove the screw ③, and remove the pre-exposure lamp unit cover ④.

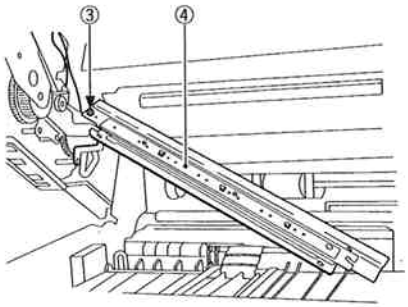

Figure 4-416

4) Disconnect the connector ⑤ (J801), and remove the pre-exposure lamp PCB unit ⑥.

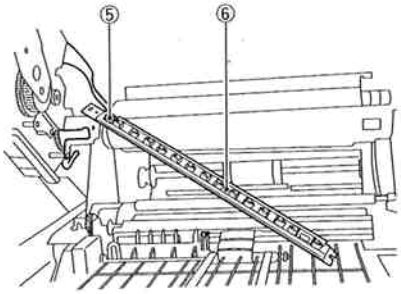

Figure 4-417

Caution:

Perform the following whenever you have replaced the pre-exposure PCB unit.

1) Enter the setting recorded on the service label attached on the back of the PCB using '37' of service mode.

Figure 4-418

2) After executing the mode, execute 'U7' still in service mode.

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V. CHARGING SYSTEM

A. Drum Unit

1. Outline

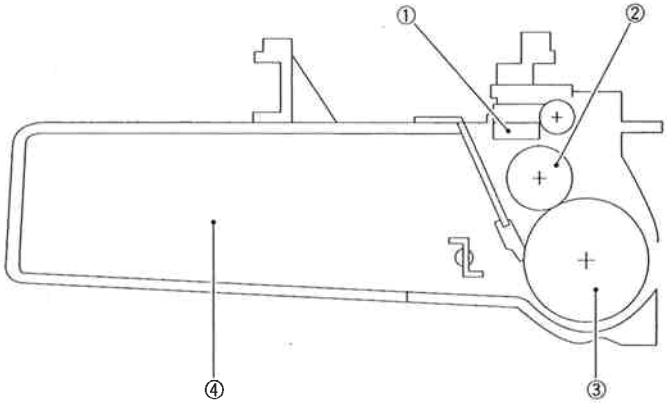

Figure 4-501

① Primary charring roller cleaning pad
② Primary charging roller
③ Photosensitive drum
④ Drum cleaner assembly

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2. Removing the Drum Unit

1) Open the copier's top unit.

2) Turn the developing locking lever ① counterclockwise.

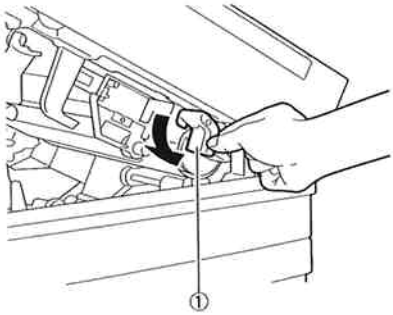

Figure 4-502

3) Turn the fixing lever ② of the drum unit counterclockwise.

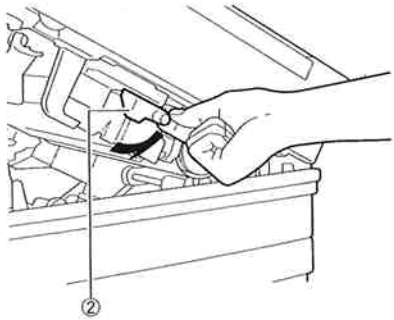

Figure 4-503

4) Pull out the drum unit ③ slowly to the front.

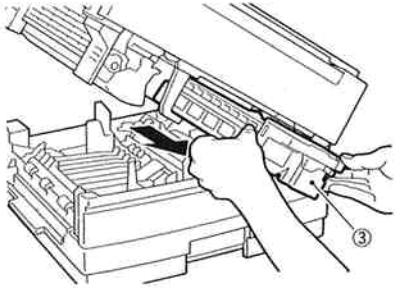

Figure 4-504

Caution:

1. Take care not to damage the photosensitive drum.
2. The photosensitive drum is highly susceptible to light. Exposure even to room light can lead to white spots or black bands on the copies.
3. Do not make a copy without the drum unit installed. Otherwise, excess loads can cause the gears of the drive system to skip teeth, generating abnormal noise.

3. Cleaning

If the surface of the photosensitive drum is soiled, wipe it with a flannel cloth coated with toner. (Do not use paper, lint-free or otherwise.)

Caution:

Do not dry wipe the drum or do not use a solvent.
Do not use drum cleaning powder.

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4. After Replacing the Drum Unit

1) Record the date and the counter reading in the label ① shown below, and attach the label to the front cover of the new drum unit.

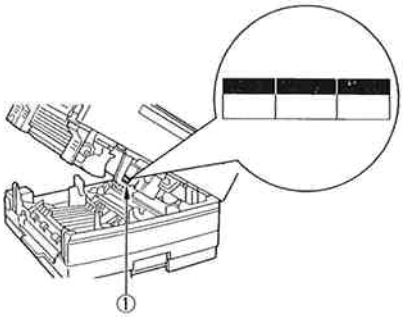

Figure 4-505

2) Execute 'U7', 'installation/drum unit replacement mode', and enter the setting recorded on the service label attached to the drum unit. (This applies only to models with the automatic indication of drum replacement time.)

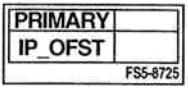

Figure 4-506

B. Transfer Corona Assembly

1. Removing the Transfer Charging Roller

1) Open the copier's top unit.
2) Remove the screw ①.

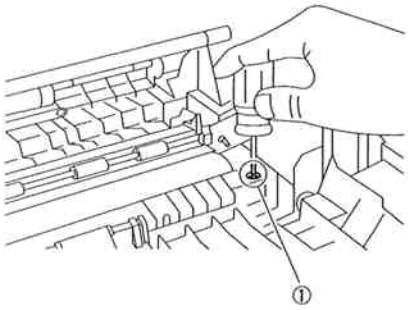

Figure 4-507

3) While disengaging the claw ② of the bushing, remove the transfer charging roller ③.

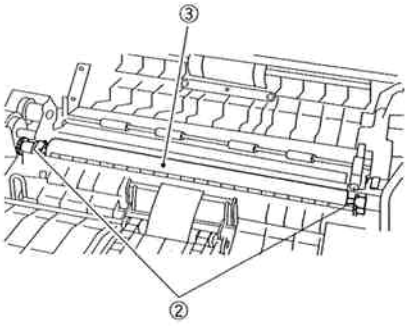

Figure 4-508

Caution:
Do not touch the roller surface; take care not to soil the roller surface.

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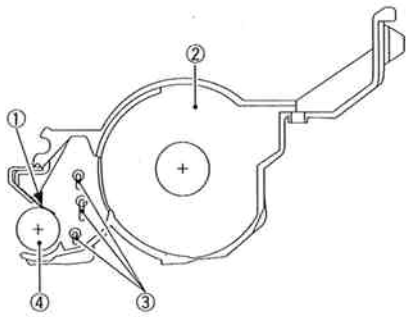
VI. DEVELOPING ASSEMBLY

A. Developing Assembly

1. Construction



① Blade
② Stirring rod
③ Hopper assembly
④ Developing cylinder

Figure 4-601

2. Removing the Developing Assembly

1) Remove the screws ①, and remove the multifeeder unit ②.

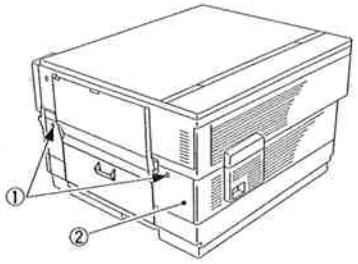


Figure 4-602

2) Open the copier, and remove the two screws ③; then, remove the front upper cover ④.

Caution:

The flexible cable for the control panel is connected to the front upper cover; disconnect the flexible cable from the DC controller.

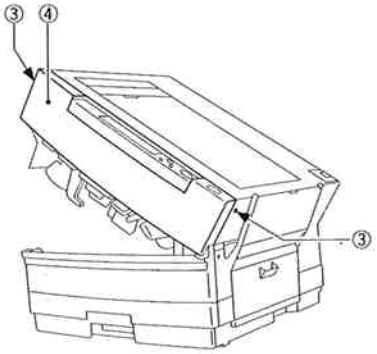


Figure 4-603

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3) Remove the drum unit.
4) Turn the toner cartridge ⑤ clockwise.

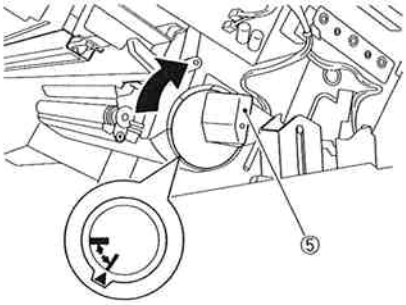

Figure 4-604

5) Put a hand under the developing assembly ⑥, and turn the locking lever ⑦ counterclockwise.
   • Turning the locking lever disengages the developing assembly.

Caution:
Take care not to touch the developing cylinder.

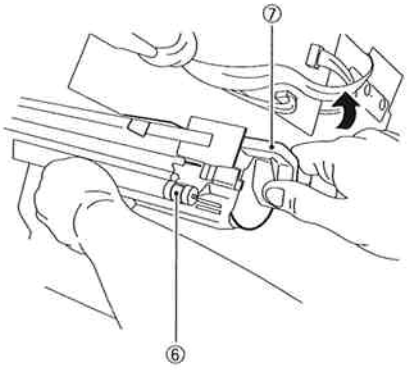

Figure 4-605

3. Installing the Developing Assembly

1) Insert the hook ① of the developing assembly into the hole ② the copier's top unit.

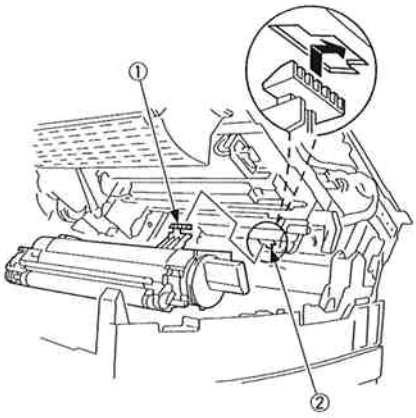

Figure 4-606

2) While working as in step 1), lift the developing assembly and butt the groove ④ of the developing assembly against the hooks ③ at the rear and the front.

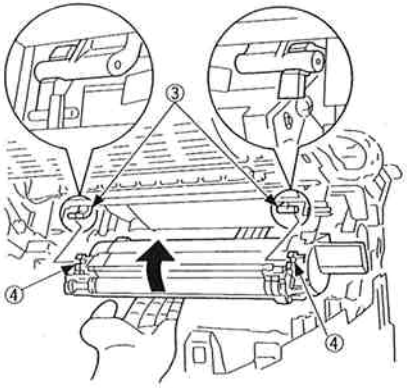

Figure 4-607

3) While working as in step 2), turn the locking lever ⑤ clockwise for a single notch.
   • The developing unit will be fixed in position while it remains unlocked.

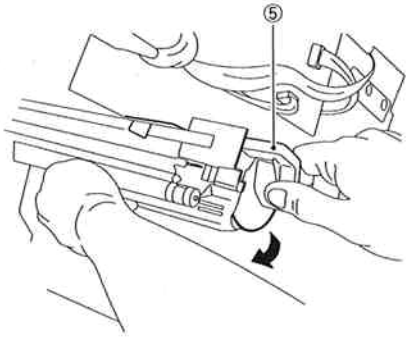

Figure 4-608

4. Removing the Developing Cylinder

1) Remove the developing assembly from the copier.
2) Turn the toner cartridge ① clockwise, and pull it out slowly toward the front.

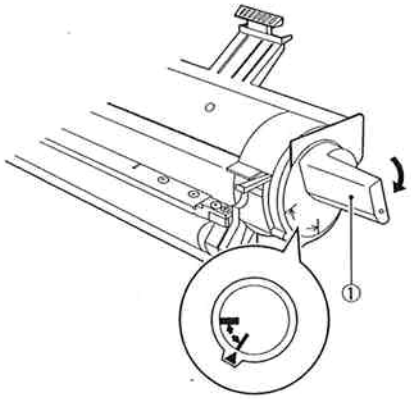

Figure 4-609

3) Clean the area around the toner cartridge you have removed.

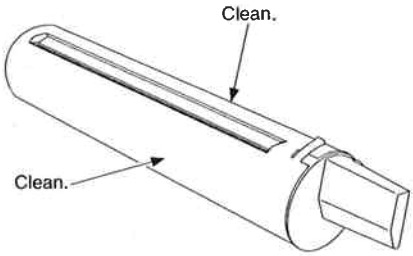

Figure 4-610

4) Remove the five screws ②, and remove the cover ③.

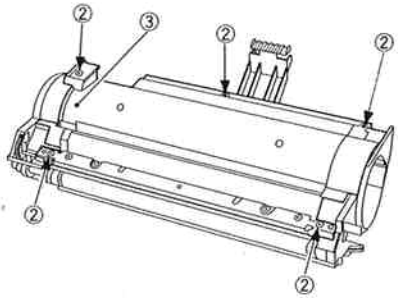

Figure 4-611

Caution:
Take care not to damage the developing cylinder and the blade when removing the blade.

5) Place a newspaper on the floor, and pour out the toner from the developing cylinder.

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6) Remove the two screws ④, and remove the gear support plate ⑤ from the rear.

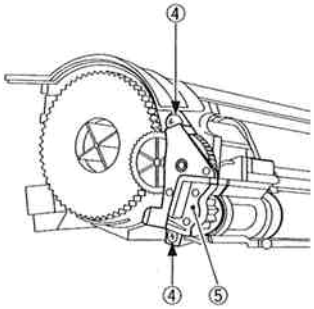

Figure 4-612

7) Remove the two screws ⑥, and remove the developing cylinder support plate ⑦ at the front.

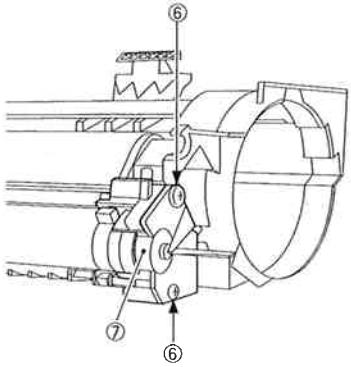

Figure 4-613

8) Remove the gear ⑧, gear ⑨, bearing ⑩, and spacer ⑪; then, remove the developing cylinder ⑫.

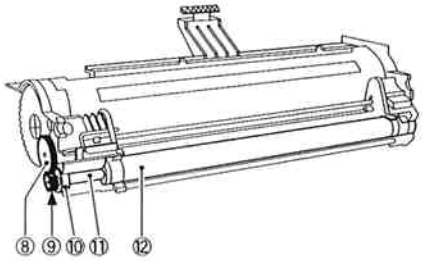

Figure 4-614

5. Points to Note When Installing the Developing Cylinder

a. Clean the compartment in the developing assembly used to store the toner cartridge.

b. Do not leave fingerprints or oils on the surface of the developing cylinder. If necessary, dry wipe the surface with lint-free paper.

c. When installing the developing assembly cover, perform the following:

1) Apply a thin coating of toner on the blade ① with a flannel cloth.

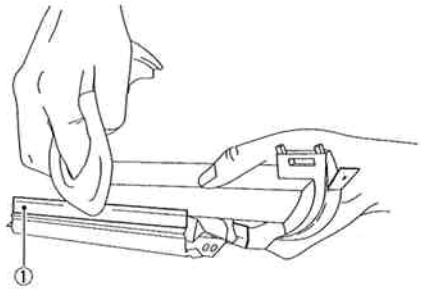

Figure 4-615

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2) Install the developing assembly cover, and tighten the five screws lightly; then, tighten the screws in the order indicated below.

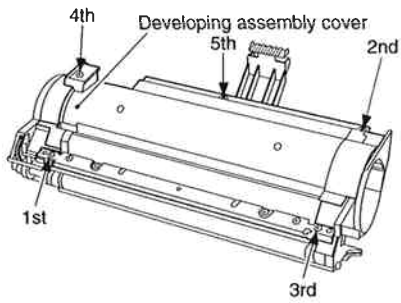

Figure 4-616

3) Turn the drive gear ④ slowly in the direction indicated below to give the developing cylinder a full turn.

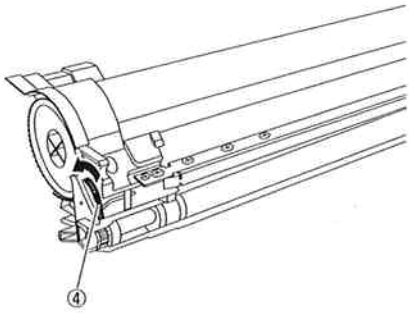

Figure 4-617

6. Points to Note When Installing the Drive Gear

a. Assemble the gears so that all three stirring rods ① face the same direction.

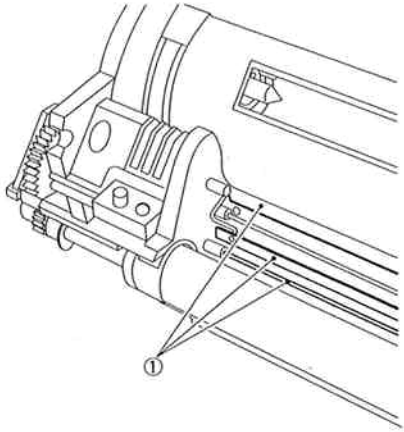

Figure 4-618

Caution:

If any of the stirring rods does not face the same direction, the interference among the rods can prevent stirring operation.

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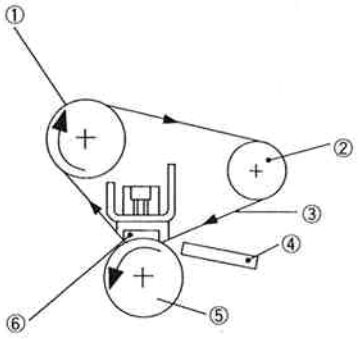
VII. FIXING SYSTEM

1. Construction



① Drive roller
② Tension roller
③ Fixing film
④ Inlet guide
⑤ Lower fixing roller
⑥ Fixing heater

Figure 4-701

Caution:
The fixing film is made of special material; do not touch it or soil it.
The upper fixing unit is to be replaced on a unit basis.

2. Removing the Upper Fixing Unit

1) Open the copier's top unit.
2) Remove the two screws ①, and remove the front upper cover ②.

Caution:
The flexible cable for the control panel is connected to the front upper cover; disconnect the cable from the DC controller PCB.

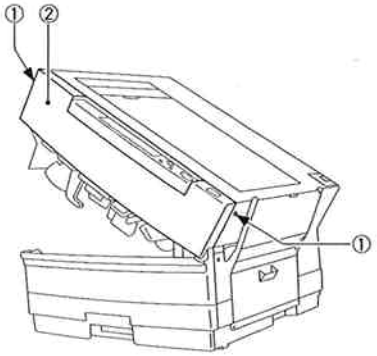


Figure 4-702

3) Disengage the two claws ③, and slide the left cover ④ down to remove.

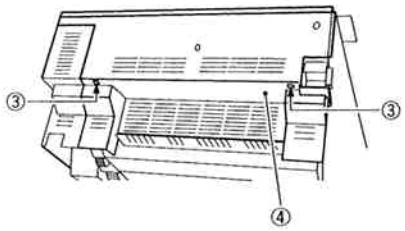


Figure 4-703

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4) Disconnect the connector ⑤.

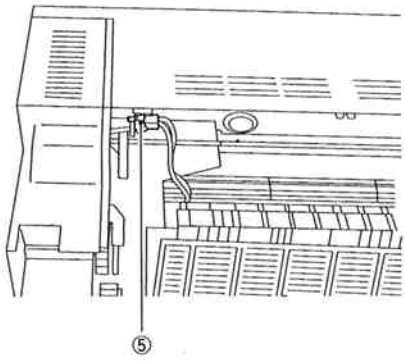

Figure 4-704

5) Disconnect the connectors J112 ⑦, J102 ⑧, and J117 ⑨ from the DC controller PCB ⑥.

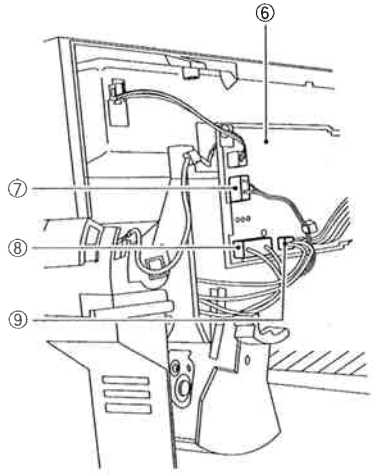

Figure 4-705

6) Remove the screw ⑩, and remove the upper fixing unit fixing plate ⑪.

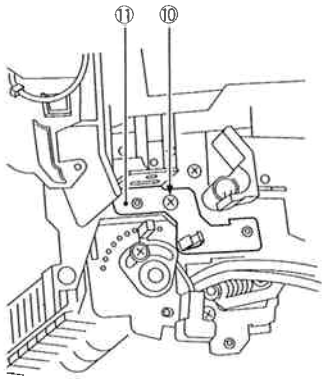

Figure 4-706

7) While avoiding the fixing assembly shutter ⑫, remove the upper fixing unit ⑬ while holding it with copy paper ⑭.

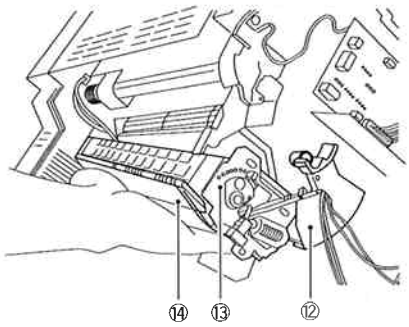

Figure 4-707

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3. After Replacing the Fixing Assembly

Rotate the fixing assembly film for about 5 min, and check the position of the tension roller.

Before the Work

Mark the position of the tension roller on the front side plate of the upper fixing unit.

1) The position of the tension roller is 'center ±2 mm'. Put markings at +2 mm and -2 mm.

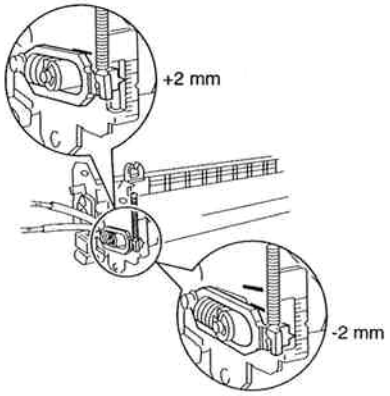

Figure 4-708

Rotating the Fixing Film

1) Turn on the power switch, and short the jumpers JP3 and JP4 on the DC controller PCB with a screwdriver.
   - The ratio/count indicator on the control panel indicates 'F'.

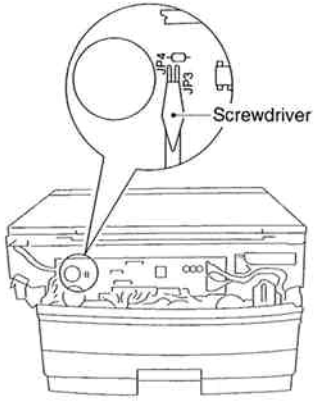

Figure 4-709

2) Stop shorting the jumpers; then, by pressing the +/- key, bring up '40' on the ratio/count indicator on the control panel, and press the Copy Start key.
   - The scanning amp turns on, and the main motor starts to rotate.
3) After about 5 min, make sure that the swing arm is at the center of the markings while the main motor is rotating.

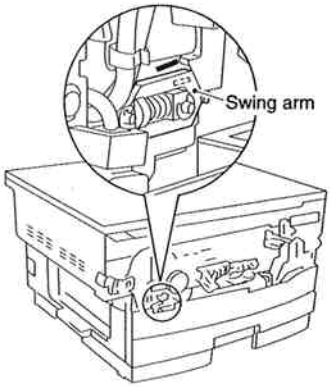

Figure 4-710

4) If the swing arm is not within the markings, press the Clear/Stop key to stop the ongoing operation; then, loosen the fixing screw of the adjusting roll, and turn the roll for 1 to 2 increments to suit the swing of the arm.

Direction of swing (swing arm)	Direction of rotation (adjusting roll)
Farther up than standard	Counterclockwise (moves down the swing arm)
Father down than standard	Clockwise (moves up the swing arm)

Table 4-701

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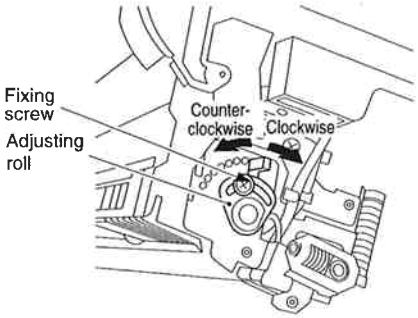

Figure 4-711

5) After making the adjustment, tighten the adjusting roll fixing screw to fix the roll in place.
6) Turn off the power switch, and measure the position of the fixing film from the front side plate of the fixing assembly.
The standard is 13 to 17 mm; if it is outside the standard, replace the upper fixing unit.

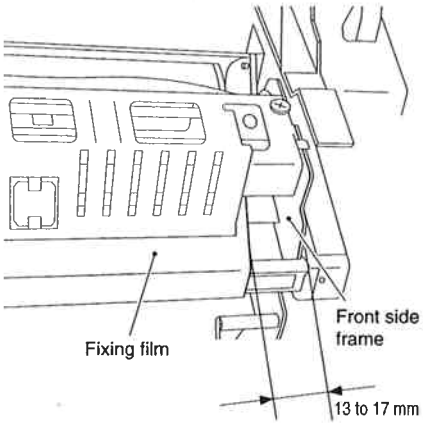

Figure 4-712

4. Removing the Lower Fixing Roller

1) Open the copier's top unit.
2) Remove the delivery roller.
(See "1. Removing the Delivery Roller" under "E. Delivery Assembly.")
3) While disengaging the four claws ①, remove the lower fiting roller unit ②.

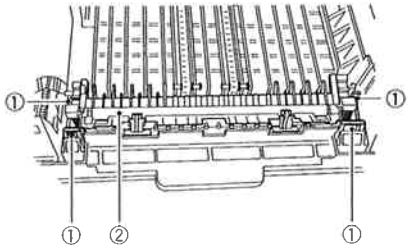

Figure 4-713

4) Remove the two springs ③ and two bushings ④, and remove the lower fixing roller ⑤ and the inlet guide ⑥.

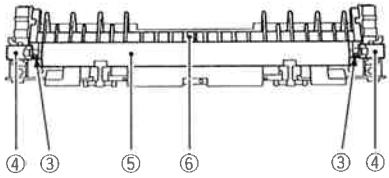

Figure 4-714

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5) Remove the inlet guide retainer ⑦, and remove the inlet guide ⑥ from the lower fixing roller.

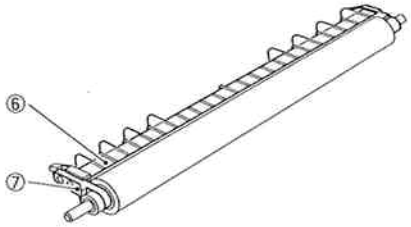

Figure 4-715

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VIII. ELECTRICAL SYSTEM

A. DC Controller PCB

1. Removing the DC Controller PCB

1) Open the copier's top unit.
2) Remove the two screws ①, and remove the front upper cover ②.

Caution:

The flexible cable for the control panel is connected to the upper front cover; disconnect the cable from the DC controller PCB.

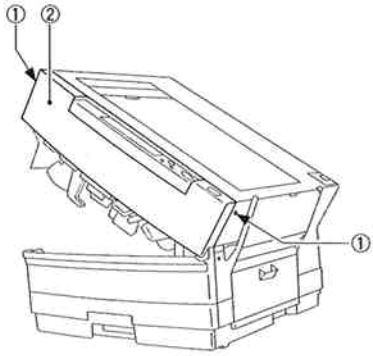

Figure 4-801

3) Disconnect all connectors from the DC controller PCB ③; then, remove the screw ④ and free the six claws ⑤ to remove the DC controller PCB ③.

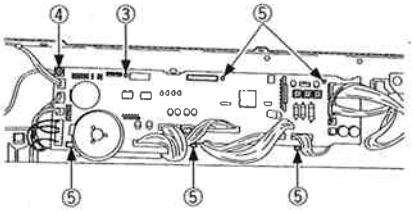

Figure 4-802

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B. Composite Power Supply PCB

1. Removing the Composite Power Supply PCB

1) Open the copier's top unit.
2) Remove the left cover and the rear cover.
3) Remove the screw ①, and remove the copyboard cover support retainer ②.

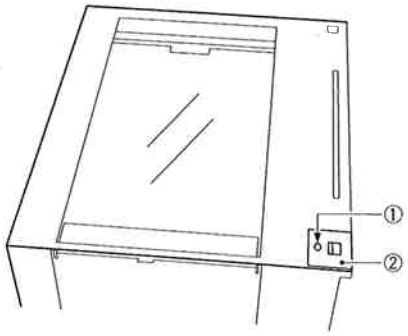

Figure 4-803

4) Disconnect the twelve connectors ④ from the composite power supply PCB ③.

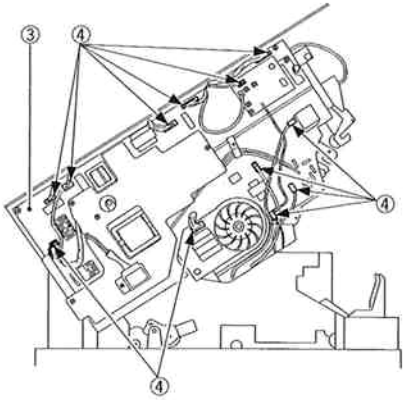

Figure 4-804

5) Remove the seven screws ⑤, and remove the composite power supply PCB ③ while freeing the five claws ⑥.

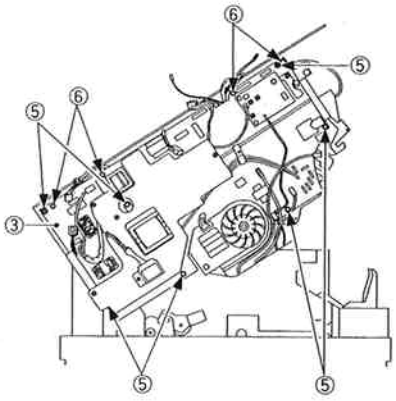

Figure 4-805

2. Points to Note When Handling the Composite Power Supply PCB

Some capacitors on the composite power supply hold charges when the copier's power supply is off.

Take extra care never to short the terminals of the capacitor whenever you have removed the composite power supply PCB.

3. After Replacing the Composite Power Supply PCB

1) Enter the setting recorded on the service label attached to the composite power supply PCB using '34' and '35' of service mode.

	115V	230V
34	PW OFST	
35	IP ADJ	

FB3-0810

Figure 4-806

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IX. ADF

A. Removing the ADF

1) Pull up the open/close lever ① to open the top unit.

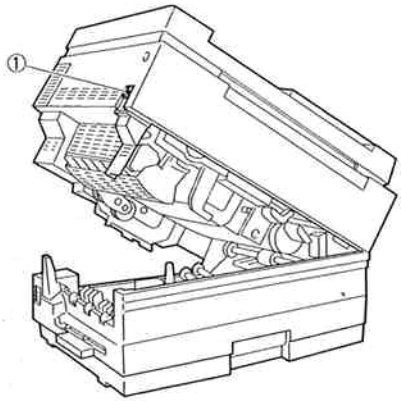

Figure 4-901

2) Disengage the two claws ②, and remove the lower left cover ③ downward.

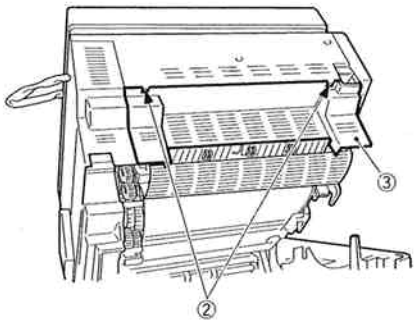

Figure 4-902

3) Remove the screw ④, and remove the rear cover ⑥ while disengaging the four claws ⑤.

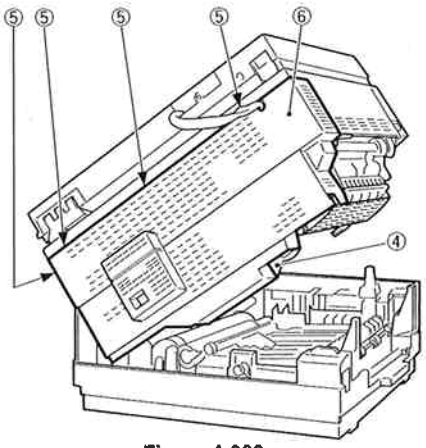

Figure 4-903

4) Close the top unit.
5) Remove the two screws ⑦, and remove the fixing plate ⑧.

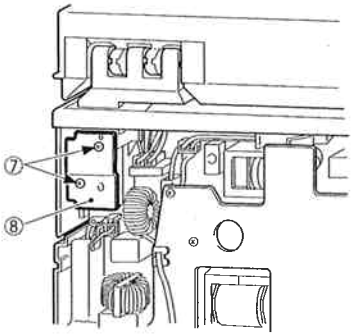

Figure 4-904

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6) Disconnect the two connectors ⑨, and remove the two lock pins ⑩; then, remove the screw ⑫, and remove the grounding wire ⑪.

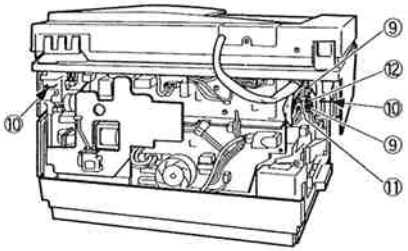

Figure 4-905

7) Remove the cable bush ⑬, and remove the ADF from the copier.

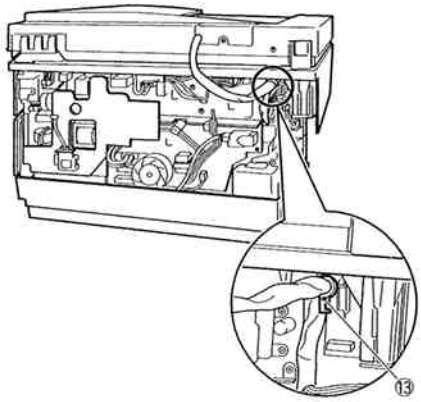

Figure 4-906

B. External Covers

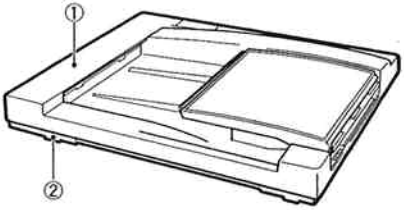

Figure 4-907

① Upper cover
② Lower cover

Remove the covers as follows when cleaning, checking, or repairing the inside of the machine:

1) Remove the ADF from the copier. (See "A. Removing the ADF.")
2) Remove the feeding roller ① from the bushing ②.

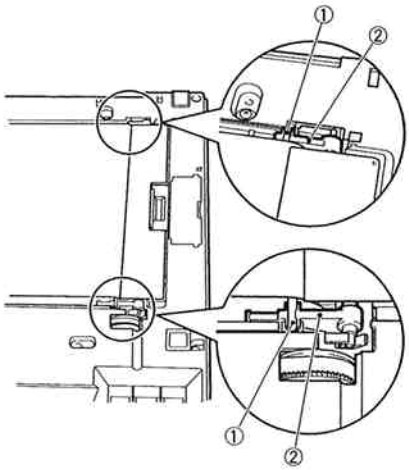

Figure 4-908

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3) Remove the six screws ③, and separate the lower cover ④ from the upper cover ⑤.

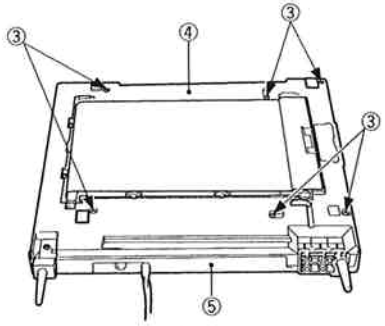

Figure 4-909

4) Disconnect the connector ⑥, and remove the lower cover ④.

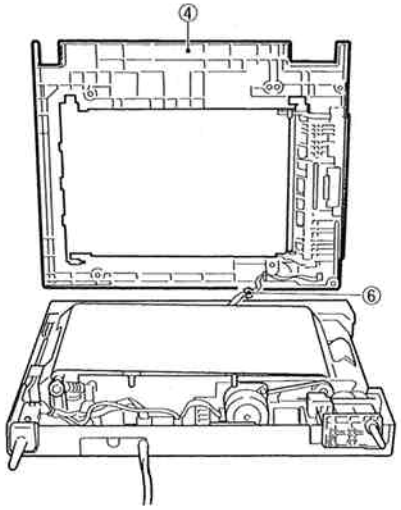

Figure 4-910

C. Drive System

1. Drive Unit

1) Remove the lower cover. (See "B. Removing the External Covers.")
2) Remove the screw ② and the bushing ③; then, remove the pick-up roller cover ①.

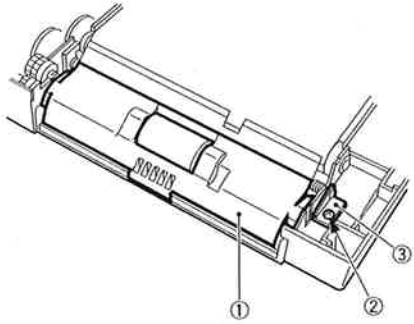

Figure 4-911

3) Remove the E-ring ④, and remove the bearing ⑤.

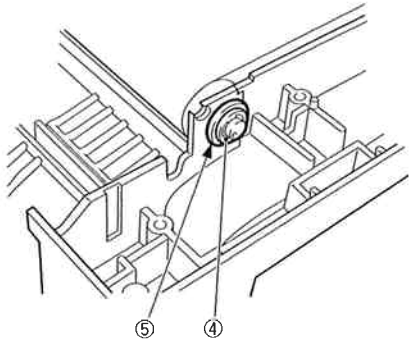

Figure 4-912

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4) Remove the timing belt ⑥, and remove the feeding belt roller ⑦ by shifting it in the direction of the arrow.

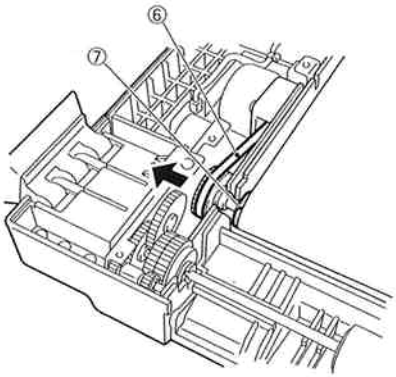

Figure 4-913

5) Remove the five screws ⑨, and remove the right hinge unit ⑧.

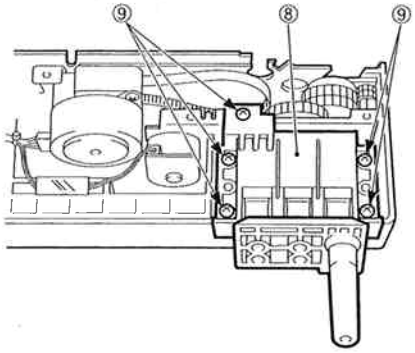

Figure 4-914

6) Remove the stop ring ⑩ (resin) and the bushing ⑪.

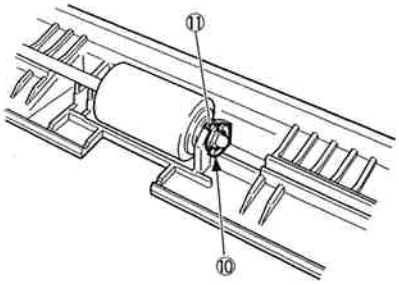

Figure 4-915

7) Disconnect the two connectors ⑫, and remove the five screws ⑬; then, remove the drive unit ⑭.

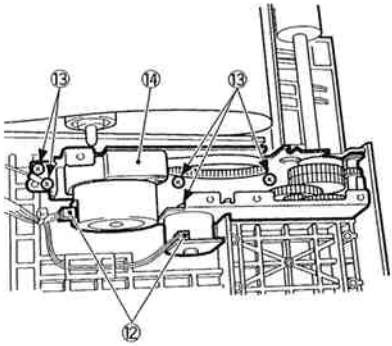

Figure 4-916

D. Feeding System

1. Pick-Up Roller

1) Remove the drive unit ①. (See "1. Drive Unit.")

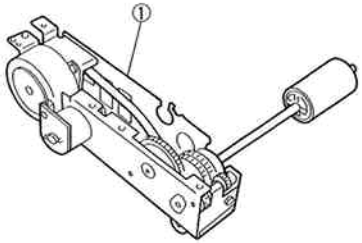

Figure 4-917

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2) Remove the stop ring ② (made of resin), and remove the pick-up roller ③.

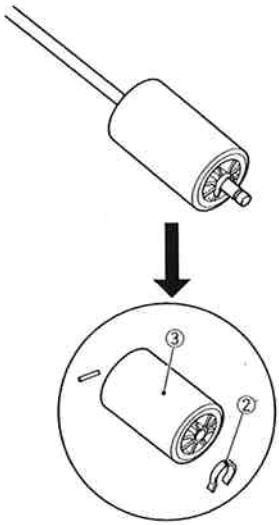

Figure 4-918

2. Registration Roller

1) Remove the lower cover. (See "B. External Covers.")
2) Remove the link arm ① from the registration roller shaft ② by turning the link arm.

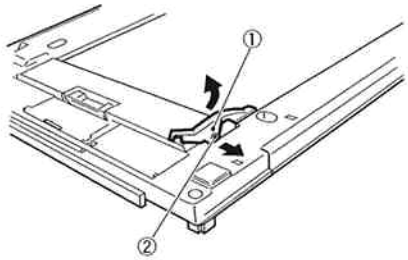

Figure 4-919

3) While pushing the bushing ③ in the direction of the arrow, pull out the registration roller shaft ② slowly.

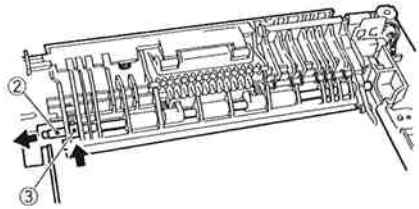

Figure 4-920

Caution:

When installing the registration roller shaft ②, be sure to orient the cut-off of the shaft as follows first.

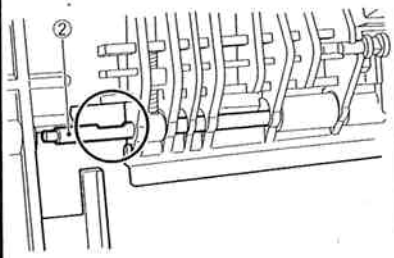

Figure 4-921

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3. Feeding Belt

1) Remove the lower cover. (See "B. Removing the External Covers.")
2) Remove the two tension springs ①.

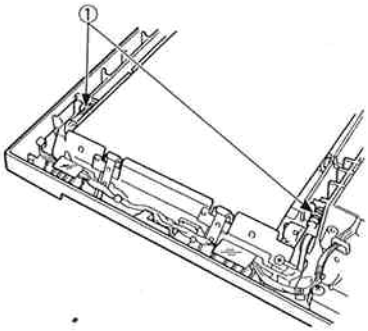

Figure 4-922

3) Remove the E-ring ②, and remove the bearing ③.

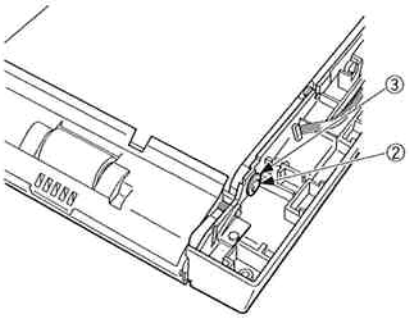

Figure 4-923

4) Remove the timing belt ④, and remove the feeding belt drive roller ⑤ by moving it in the direction of the arrow.

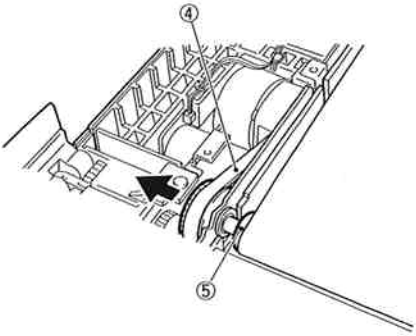

Figure 4-924

5) Remove the two equalizer spring ⑥ and the two feeding belt rolls ⑦.

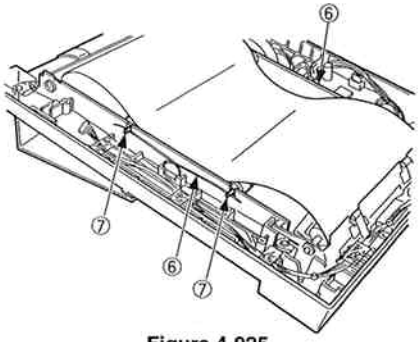

Figure 4-925

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6) Remove the two screws ⑨, and remove the delivery sensor unit ⑧.

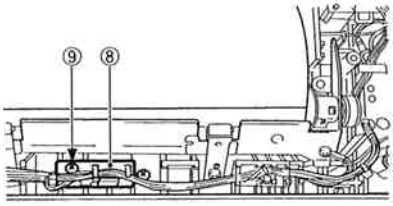

Figure 4-926

7) Remove the stop ring ⑩ (made of resin); then, remove the bushing ⑪.

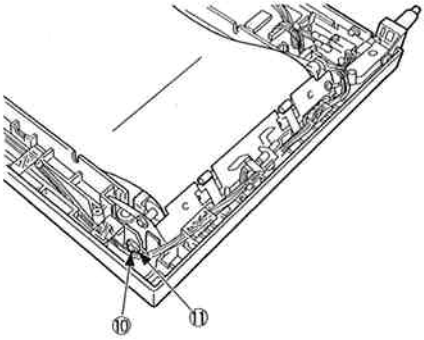

Figure 4-927

8) Remove the screw ⑫, and remove the grounding wire ⑬; then, remove the delivery roller unit ⑭ by moving it in the direction of the arrow.

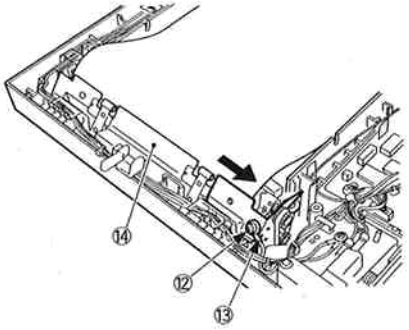

Figure 4-928

9) Remove the screw ⑮, and remove the static eliminating brush ⑯.

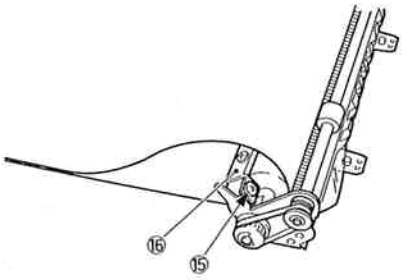

Figure 4-929

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10) Remove the two E-rings ⑰; then, remove the timing belt ⑱, gear ⑲, and two bushings ⑳.

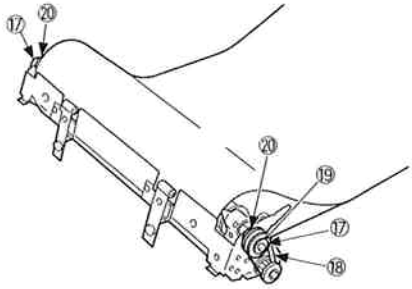

Figure 4-930

11) Pull out the actuator ㉑ in the direction of the arrow; then, remove the feeding belt link roller ㉒, and remove the feeding belt ㉓

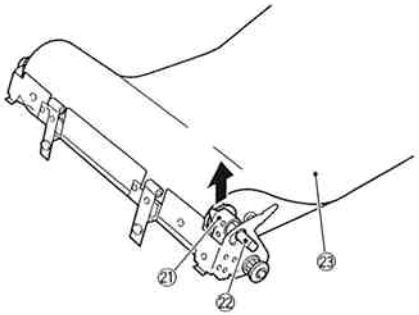

Figure 4-931

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E. Electrical System

1. ADF Controller PCB

1) Remove the lower cover. (See "B. Removing the External Covers.")
2) Disconnect the five connectors ①, and remove the two screws ②; then, remove the ADF controller PCB ③.

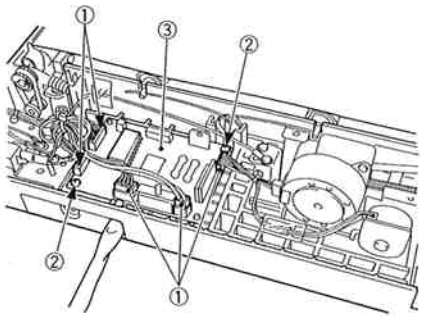

Figure 4-932

2. Original Placement Sensor and Registration Paper Sensor

Pay attention to the colors of the cables and connectors when connecting the connectors of the original placement sensor and the registration paper sensor.

Sensor	Cable color	Connector color
Original placement sensor	Purple	Blue
Registration paper sensor	Yellow	White

Table 4-901

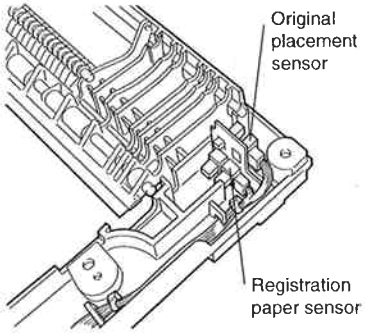

Figure 4-933

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CHAPTER 5

INSTALLATION

I. SELECTING THE SITE 5-1
II. UNPACKING AND INSTALLATION 5-2
III. RELOCATING THE COPIER 5-17

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I. SELECTING THE SITE

Make sure that the site satisfies the following requirements; pay a visit to the user's before the delivery of the machine:

- The site should have an exclusive power outlet that can provide the rated voltage ±10% (15A or more).
- The site's temperature must be 7.5° to 32.5°C and humidity, 5% to 85%. Avoid areas near water faucets, water boilers, humidifiers, and refrigerators.
- Avoid areas near sources of fire or areas subject to ammonium gas and direct rays of the sun. (As necessary, provide curtains.)
- The site must be well ventilated. The amount of ozone generated by the copier while in use will not affect the health of the individuals around it. Some, however, may find the odor unpleasant, and it is important to keep the site well ventilated.
- The site should be able to keep the copier level, with its feet firmly in contact.
- The site must allow at least 10 cm of space from all walls enough for the operation of the machine.

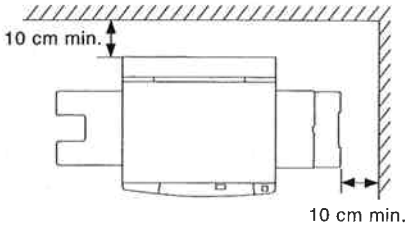

Figure 5-101

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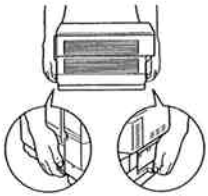
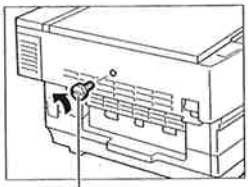
II. UNPACKING AND INSTALLATION

When a piece of metal is brought in from a cold to warm place, droplets of water tend to form on its surface. The phenomenon is called *condensation*, and a copier subjected to condensation often produces blank copies. If you are installing a copier brought in from a cold place, leave it alone unpacked for one hour or more until it becomes acclimatized to the room.

A. Unpacking and Installing

1. Setting up the Copier

Step	Work	Checks	Remarks
1	Take out the copier and accessories, and make sure none of the accessories is missing.	To take out the copier, remove the cushioning materials from its left/right and top, and hold it by hooking hands under its grips.  Accessories ① Cassette ② Copy tray ③ Power cord ④ Operator's manual ⑤ Drum unit	
2	Remove the shipping attachment ① on the left side of the main unit. (In step 8, insert the shipping attachment ① in the shipping attachment holder.)	 Shipping attachment①	**Note:** You will need this shipping attachment whenever you transport the copier, so store it in shipping attachment holder.

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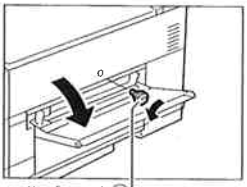
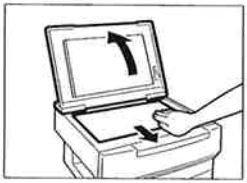
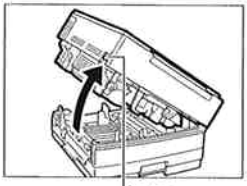
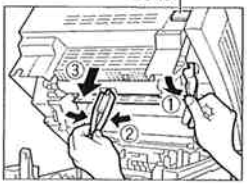
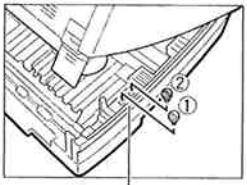
Step	Work	Checks	Remarks
3	Remove the shipping attachment ② on the right side of the main unit. (In step 7, insert the shipping attachment ② in the shipping attachment holder.)	 Shipping attachment ②	**Note:** You will need this shipping attachment wherever you transport the copier, so store it in the shipping attachment holder.
4	Raise the platen glass cover and remove the sheet from the platen glass.		
5	Lift the main unit lever on the left side to open the top of the main unit.	 Lever	
6	Squeeze and remove the attachment located inside under the top of the main unit.	Lever 	
7	Insert the shipping attachment ① and ② in the shipping attachment holder which were removed in steps 2 and 3.	 Shipping attachment holder	

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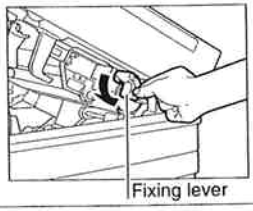
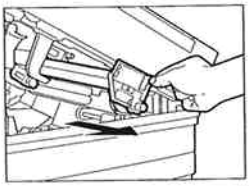
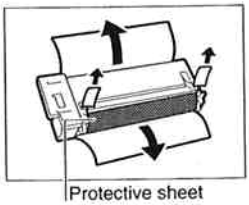
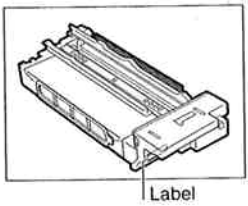
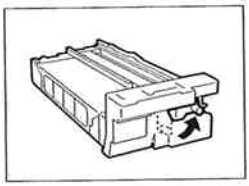
2. Installing the Drum Unit

Step	Work	Checks	Remarks
1	Turn the fixing lever counter-clockwise.		
2	Remove the dummy drum.		
3	Remove the drum unit from its shipping bag. Place a new drum unit on a flat surface, remove the bubble sheet that is wrapped around the drum unit. (Do not remove the protective sheet placed between the drum unit yet.) Next, remove the two protective pieces.		**Note:** If the protective sheet placed between the drum unit is removed, do not touch the purple coloured surface of the drum.
4	Write down the numbers from the labels which are attached to the drum unit. PRIMARY IP_OFST		**Note:** You will need to know these numbers in steps 4 and 6 of "Main Unit Adjustment Operations," so it is important that you write them down to have a record of them. Only if working on a model without the automatic indication function for drum replacement time.
5	Turn the drum unit lever counter-clockwise.		**Note:** If you do not turn the drum unit lever counter-clockwise, then you cannot insert the drum unit.

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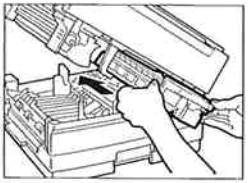
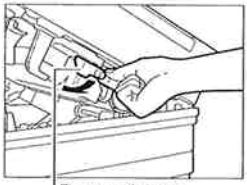
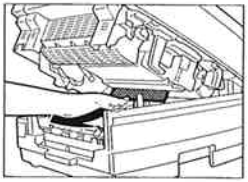
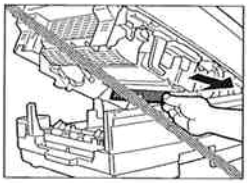
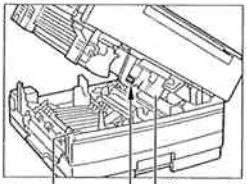
Step	Work	Checks	Remarks
6	Insert the drum unit in the direction shown in the illustration to the right. Holding the drum unit level, gently slide it into the copier. • Make sure that the drum unit is inserted all the way into the copier.		**Note:** When inserting the drum unit, do not touch the purple colored surface of the drum under the black sheet; doing so will adversely affect the copy quality.
7	Turn the drum unit lever clockwise, to lock the drum unit in place.		
8	Pull the protective sheet straight out of the left side of the copier.	 	**Note:** Pull the protective sheet o ut straight from the left side of the drum unit. If the black sheet is pulled out from the front, it might adversely affect the quality of your copies.
9	Write down the date of installation of the drum unit and the counter number on the date/counter labels that come packed together with the drum unit. Afterwards, attach the labels to the drum unit.		

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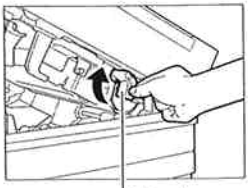
Step	Work	Checks	Remarks
10	Turn the fixing lever clockwise, to lock the inside of the main unit in place.	 Fixing lever	**Note:** If you did not turn the drum unit lever clockwise in step 6 of "Installing the Drum Unit" then you cannot turn the fixing lever clockwise. If you do not turn the fixing lever clockwise then you cannot close the main unit.

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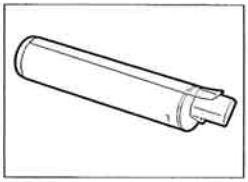
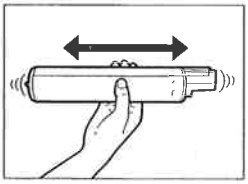
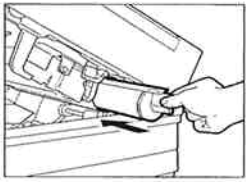
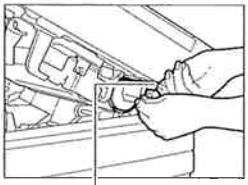
3. Installing the toner Cartridge

Step	Work	Checks	Remarks
1	Prepare to insert a new toner cartridge. **⚠Caution:** Do NOT throw the toner cartridge into fire; it can burst or explode.		
2	Hold the new toner cartridge level. Rock the cartridge to evenly distribute the toner within the cartridge.		
3	Hold the new toner cartridge level and gently insert it into the copier as far as it will go.		**Note:** Make sure that the toner cartridge is inserted all the way into the copier.
4	Pull the toner cartridge sealing tape off. Pressing down on the toner cartridge, grip the orange sealing tape tab and pull the sealing tape straight out of the cartridge. **Caution:** Never dispose of a sealing tape in a fire or incinerator.	 Sealing tape	**Notes:** • Pull the toner cartridge sealing tape off s traight. • Some toner may stick to the toner cartridge seal, so be careful not go get toner on your clothes.

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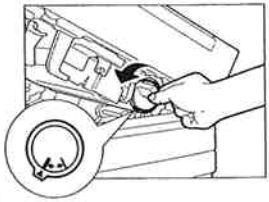
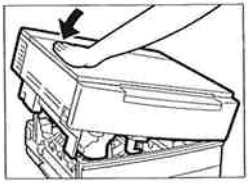
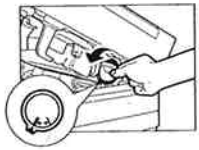
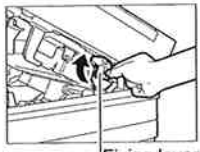
Step	Work	Checks	Remarks
5	Grip the toner cartridge handle. Turn the cartridge counter-clockwise until it locks into place.		**Note:** Turn the toner cartridge counter-clockwise all the way until it locks into place. If it is not locked into place, you cannot close the main unit. If the toner cartridge handle cannot be turned, then make sure that the toner cartridge is inserted into the copier as far as it will go.
6	Close the main unit by pressing down firmly on the part marked "✋".		**Note:** Make sure of the following three points before closing the top unit. 1. The drum unit has been installed, and the drum unit lever is at the LOCK position. Drum unit lever 2. The toner cartridge has been turned and positioned as specified.  3. The fixing lever is at the LOCK position.  Fixing lever Unless the above three points are satisfied, the lock mechanism will activate, preventing the top unit from closing.

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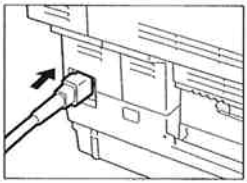
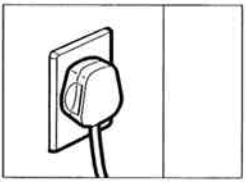
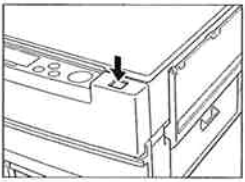
4. Connecting the Power Cord

Step	Work	Checks	Remarks
1	Plug one end of the power cord into the copier power inlet.		**Note:** Do not insert the copier plug, press the power switch or turn the power ON before completing the steps 2 to 6 of the Setting Up the Copier, If you do, you could damage your copier.
2	Plug the other end of the power cord into an outlet. **Caution:** This copier is designed for use with a power source matching the power requirements shown on the marking label at the back of the copier. If you are unsure of the power source, check with your local power company.		
3	Press the power switch ON. • "P" appears in the Copy quantity/Copy ratio display. If the model is without the automatic indication function for drum unit replacement time, the main motor rotates for about 1 min to execute automatic adjustment of the drum unit; the main motor stops automatically after automatic adjustment.		

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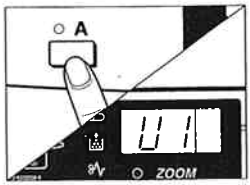
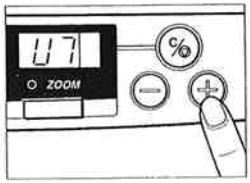
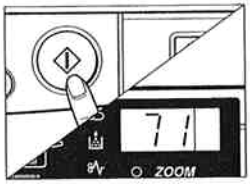
5. Main Unit Adjustment Operations

applies only to models without automatic indication for drum unit replacement.

Step	Work	Checks	Remarks
1	Main unit adjustment operations are performed from the Adjustment Operations mode. To enter this mode, hold down the A key for approximately four seconds or longer. After approximately four seconds have elapsed, "U1" appears in the Copy quantity/Copy ratio display.		
2	Enter the Installation Adjustment Operations mode ("U7"). Press down the [+] key until "U7" appears in the Copy quantity/Copy ratio display. • If you make a mistake, press the [+] or [-] key until the desired value appears in the display.		
3	Press the Start (◇) key. "71" will appear in the Copy quantity/Copy ratio display and you will enter the Voltage Adjustment mode.		

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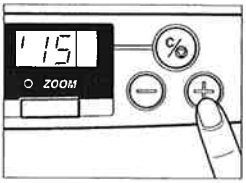
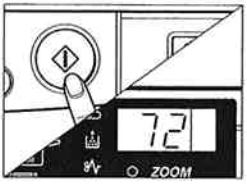
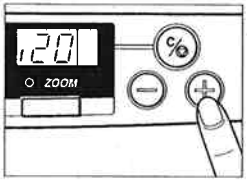
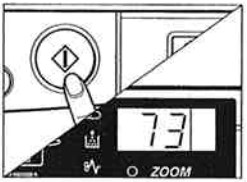
Step	Work	Checks	Remarks
4	Adjust the voltage. Press the [+] or [-] keys to enter the value for label "PRIMARY" which you wrote down in step 4 of "Installing the Drum Unit" on p. 5-4. • If you make a mistake, press the [+] or [-]key until the desired value appears in the display. • While adjusting the voltage, "*I*" will appear in the Copy quantity/Copy ratio display.		
5	Press the Start (◇) key. "72" will appear in the Copy quantity/Copy ratio display and you will enter the Electric Current Adjustment mode.		
6	Adjust the electric mode. Press the [+] or [-] keys to enter the value for label "IP_OFST" which you wrote down in step 4 of "Installing the Drum Unit". • If you make a mistake, press the [+] or [-] key until the desired value appears in the display. • While adjusting the electric current, "*I*" will appear in the Copy quantity/Copy ratio display.		
7	Press the Start (◇) key. "73" will appear in the Copy quantity/Copy ratio display and you will enter the Automatic Toner Distribution Adjustment mode.		

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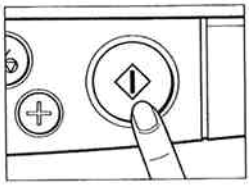
Step	Work	Checks	Remarks
8	Press the Start (◇) key. An automatic adjustment operation within the main unit will be performed and then this will be followed by an automatic toner distribution operation. When these automatic operations are finished, "1" will appear in the Copy quantity/Copy ratio display and copies can be made. When automatic operation ends, the message on the Copy quantity/Copy ratio display changes from flashing "73" to the following: if paper is present in the cassette, "1" (on). if paper is absent in the cassette, "P" (on). • It will take approximately one minute for the copier to complete the automatic adjustment and toner distribution operations. While these operations are being performed, it is recommended that you performed the next installation operations.		

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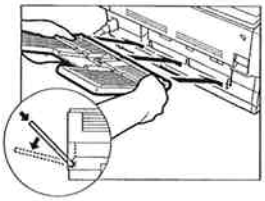
6. Installing the Copy Tray

Step	Work	Checks	Remarks
1	Insert the copy tray into the copier. Insert the copy tray so that it fits into the three holes located on the side of the copier. • Make sure that the copy tray is inserted into the copiers as far as it will go.		

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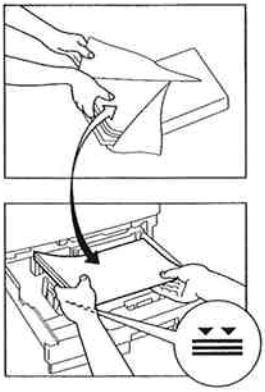
7. Loading Paper in the Cassette

Step	Work	Checks	Remarks
1	Remove the materials from inside the cassette, and adjust the paper width and length guides inside the cassette to suit the size of copy paper; then, set copy paper. • For more details, see p. 5-16.	• The copy paper has its face and back; be sure to place it correctly inside the cassette butting it against the right side of the cassette. • Make sure that the stack of copy paper is not above the height index on the inner side of the paper width guide. 	

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8. Checking the Operation

Step	Work	Checks	Remarks
1	Set the Test Sheet on the copyboard, and check copying operation.	• Make sure there is no abnormal noise. • Make sure that as many copies as specified are made normally.	
2	Clean the copier's exterior and the area around it.		

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B. Setting Copy Paper

Adjust the paper width and length guides inside the cassette to suit the size of copy paper.

1) Slide out the cassette from the copier.
2) Move the paper length guide inside the cassette to suit the length of the copy paper to be used.

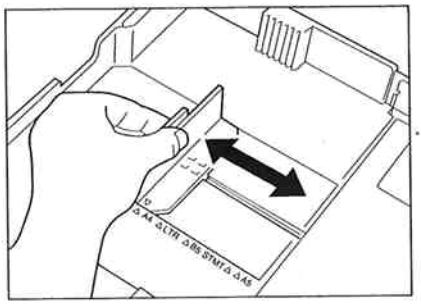

Figure 5-201

3) Move the paper width guide inside the cassette to suit the width of the copy paper to be used.

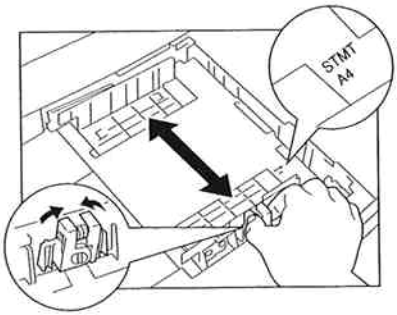

Figure 5-202

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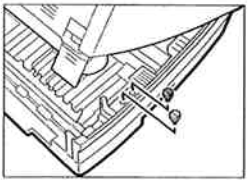
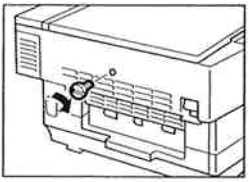
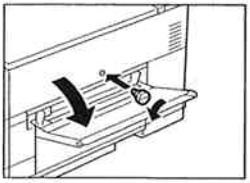
III. RELOCATING THE COPIER

Go through the following steps if you must relocate the copier by truck or other means of transportation:

Step	Work	Checks
1	Turn on the power switch, and press the Default Ratio key to select 70%.	
2	Press the Paper Select key to select the multifeeder tray.	
3	Without placing any paper on the multifeeder tray, press the Copy Start key.	The machine automatically makes adjustments for installation of the fixing screw. • When the adjustment is over, the indicator representing the multifeeder on the control panel starts to flash and the count/ratio indicator indicates 'P'.
4	Turn off the power switch, and disconnect the power plug.	
5	Lift the copier open/close lever, and open the copier.	
6	Take out the screws stored at time of installation.	
7	Close the top unit securely, and tape it to prevent it from opening.	
8	Place A4 copy paper on the copyboard glass, close the copyboard cover, and tape it in place.	
9	Fit the screws taken out in step 6 to the left and the right of the copier.	 

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CHAPTER 6

MAINTENANCE AND SERVICING

I. PERIODICALLY REPLACED PARTS 6-1
II. DURABLES AND CONSUMABLES 6-1
III. SCHEDULED SERVICING 6-1

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I. PERIODICALLY REPLACED PARTS

The copier does not have a part to be replaced on a periodical basis.

II. DURABLES AND CONSUMABLES

The copier does not have a part classified as a durable or consumable part.

III. SCHEDULED SERVICING

The copier has no part that must be serviced on a periodical basis.

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APPENDIX

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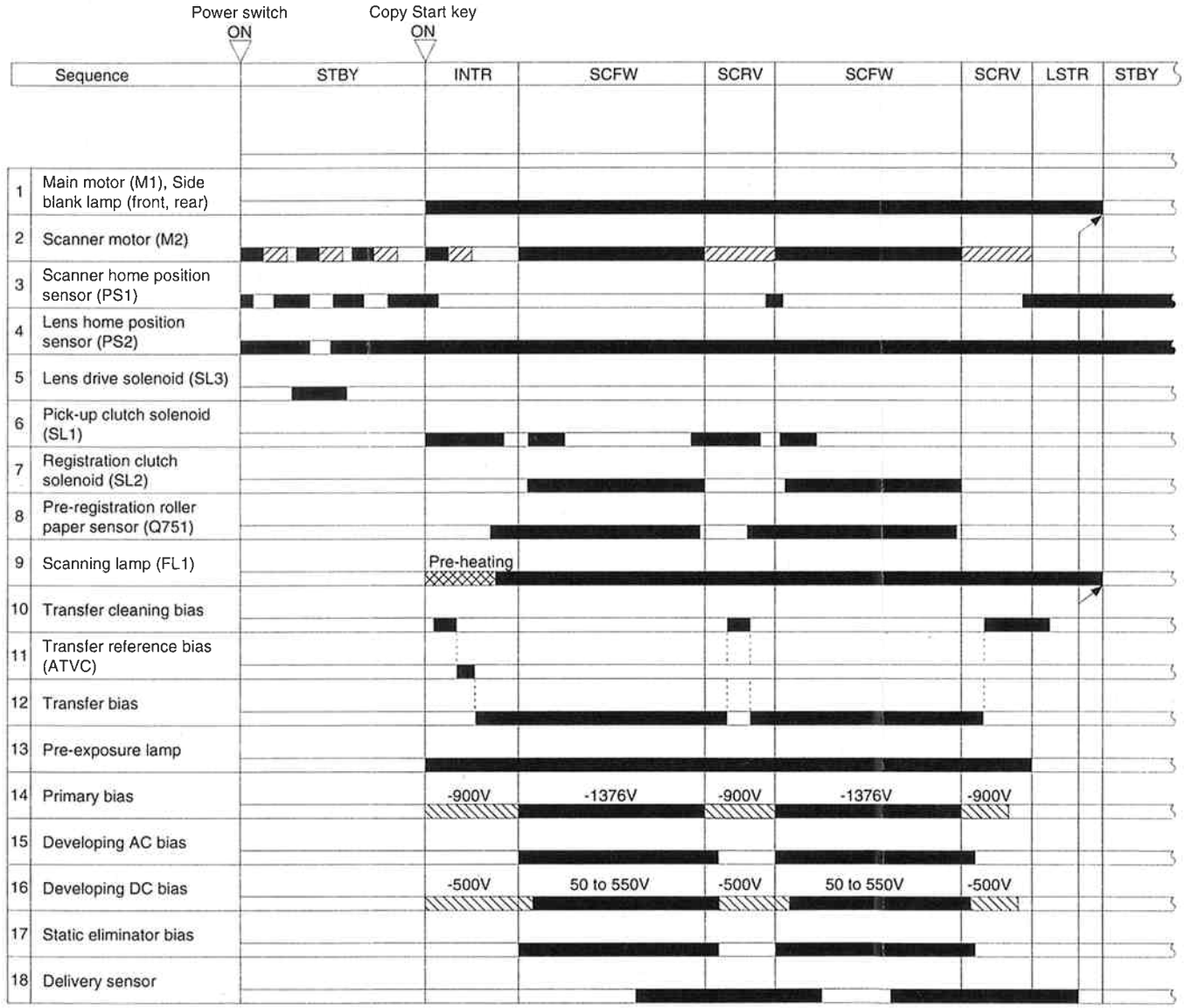
A. GENERAL TIMING CHART

1.NP6012

(A4, 2 copies, DIRECT, from cassette)



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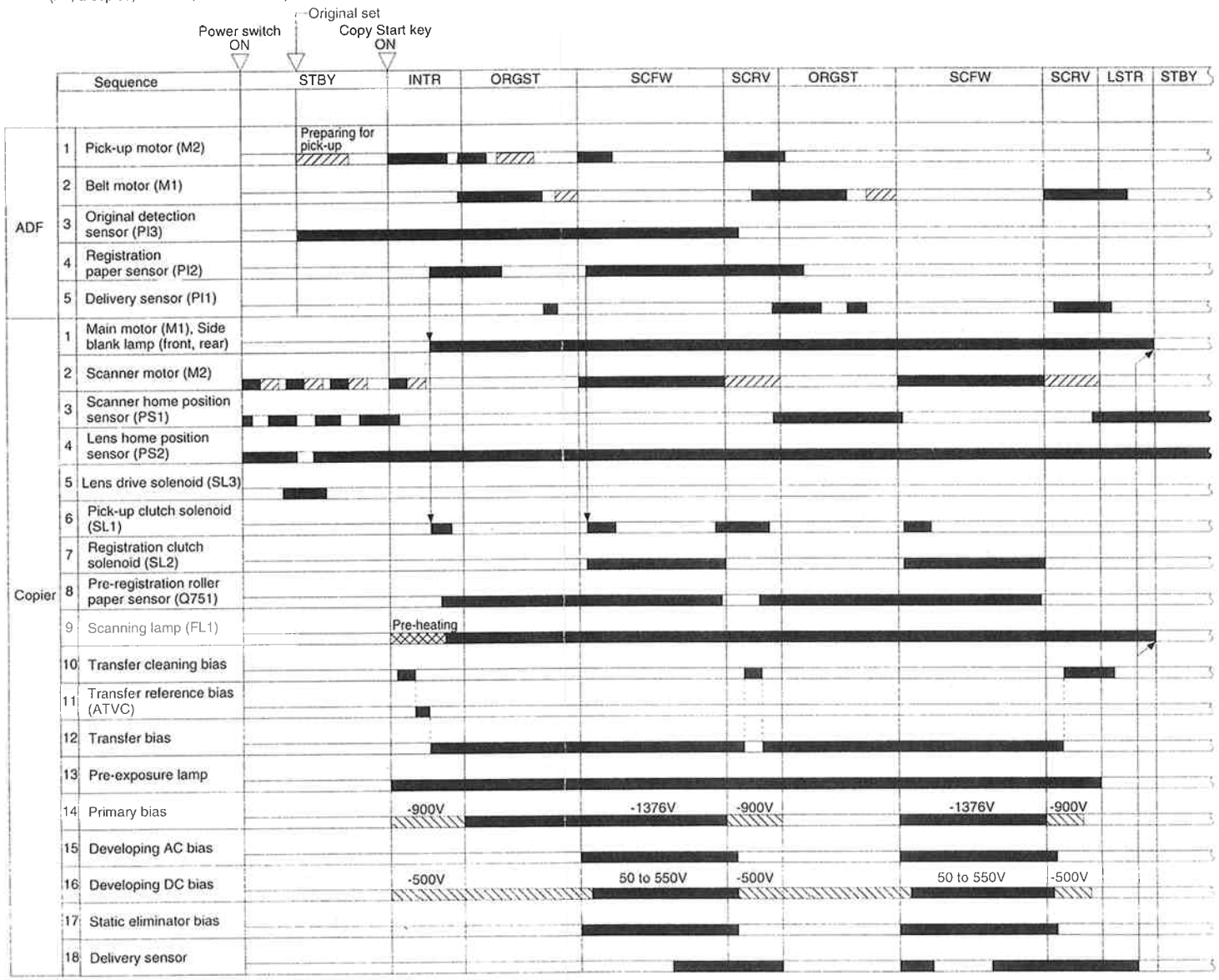

: Scanning motor (reverse) / Pick-up motor (reverse) / Belt motor (reverse)

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B. SIGNALS AND ABBREVIATIONS

1.Signals

ACBIAS	AC BIAS OSCILLATION signal
ADFC	ADF CLOSED signal
AE	AE SENSOR OUTPUT signal
AEREF	AE SENSOR REFERENCE signal
BIASS	DEVELOPING DC BIAS VOLTAGE DETECTION signal
CLSLD	CLEANING SOLENOID DRIVE command
CPD	CASSETTE PAPER DETECTION signal
DCBPWM	DC BIAS CONTROL signal
DPD	DELIVERY PAPER DETECTION signal
DVACON	DEVELOPING AC BIAS ON signal
DVDCON	DEVELOPING DC BIAS ON signal
FFD	FIXING FILM POSITION signal
FL ON	FLUORESCENT LAMP ON command
FLEXP	SCANNING LAMP INTENSITY signal
FLPRHT	PRE-HEAT VOLTAGE CONTROL signal
HTNG	FUSER HEATER NG signal
HTRD	HEATER DRIVE command
LHP	LENS HOME POSITION signal
LNSLD	LENS SOLENOID DRIVE command
MA	BELT MOTOR (A) DRIVE command
MB	BELT MOTOR (B) DRIVE command
MFSLD	MULTIFEEDER PICK-UP SOLENOID DRIVE command
MLOCK	MAIN MOTOR LOCK signal
MMCLK	MAIN MOTOR CLOCK signal
MMD	MAIN MOTOR DRIVE command
PACON	PRIMARY BIAS ON signal
PDCPWM	PRIMARY DC BIAS CONTROL signal
PDP1	PAPER DETECTION signal 1
PDP2	PAPER DETECTION signal 2
PDP3	PAPER DETECTION signal 3
PM	PICK-UP MOTOR DRIVE signal
PUSLD	PICK-UP CLUTCH SOLENOID DRIVE command
RGSLD	REGISTRATION CLUTCH SOLENOID DRIVE command
RPD	REGISTRATION PAPER DETECTION signal
SBLP	SIDE BLANK EXPOSURE LAMP ON signal
SC-A	SCANNER MOTOR PULSE command A
SC-A*	SCANNER MOTOR PULSE command A*
SC-B	SCANNER MOTOR PULSE command B
SC-B*	SCANNER MOTOR PULSE command B*
SC-COMA	SCANNER MOTOR DRIVE command A
SC-COMB	SCANNER MOTOR DRIVE command B
SCHP	SCANNER HOME POSITION signal
SPD	SINGLEFEEDER PAPER DETECTION signal
TFDBCK	TRANSFER VOLTAGE MONITOR signal
TFWDRV	TRANSFER DC BIAS CONTROL signal
TFWON	TRANSFER DC BIAS ON signal
TFWS	TRANSFER CURRENT DETECTION signal
TH1	FIXING MAIN THERMISTOR signal
TH2	FIXING SUB THERMISTOR signal
TNMONI	TONER LEVEL signal
TREVON	TRANSFER POSITIVE BIAS ON signal
WTOF	EXCESS WASTE TONER signal

2. Abbreviations

CBFW	COPY BOARD FORWARD
CBRV	COPY BOARD REVERSE
INTR	INITIAL ROTATION
LSTR	LAST ROTATION
ORGST	ORIGINAL SET
STBY	STANDBY

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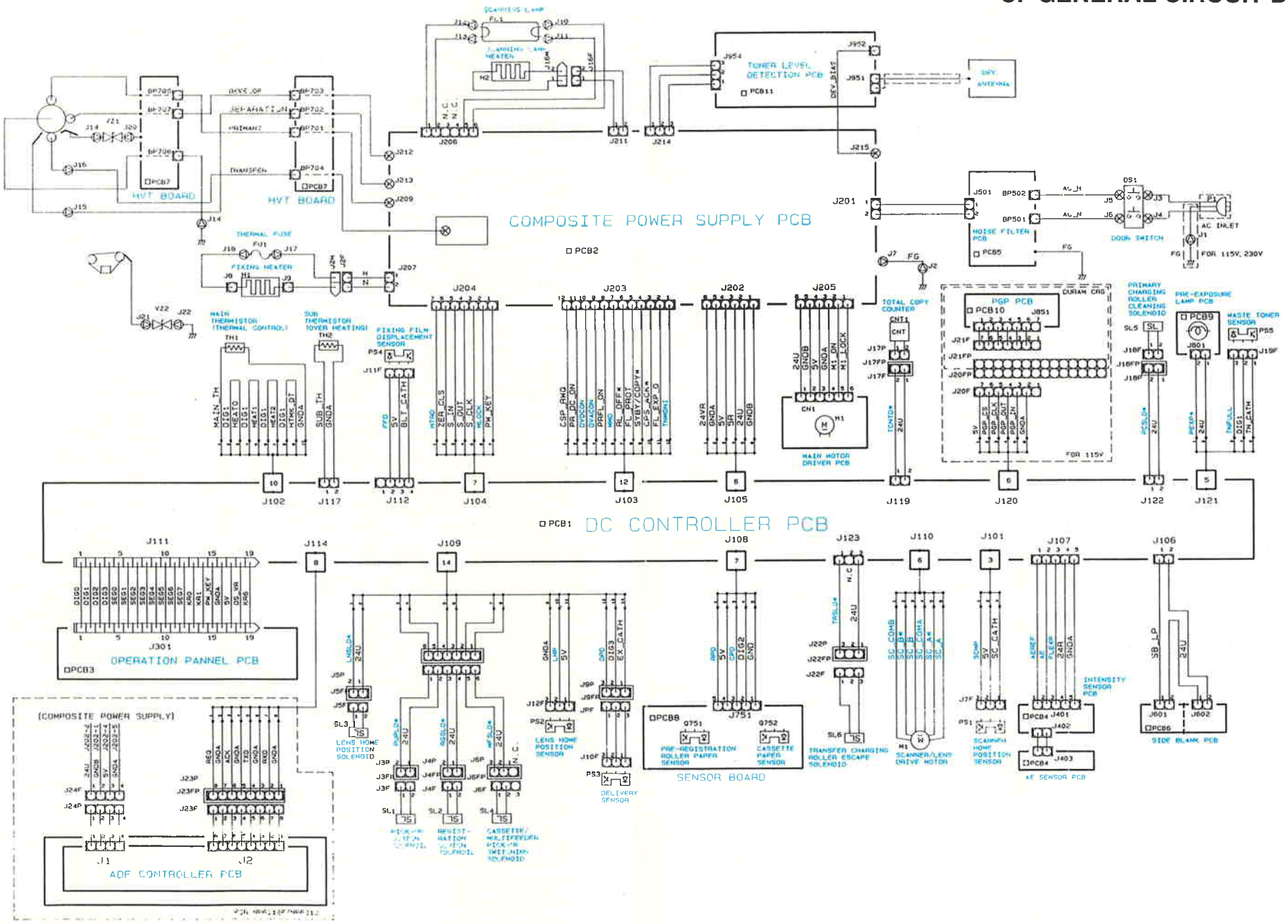
C. GENERAL CIRCUIT DIAGRAM

1.Copier



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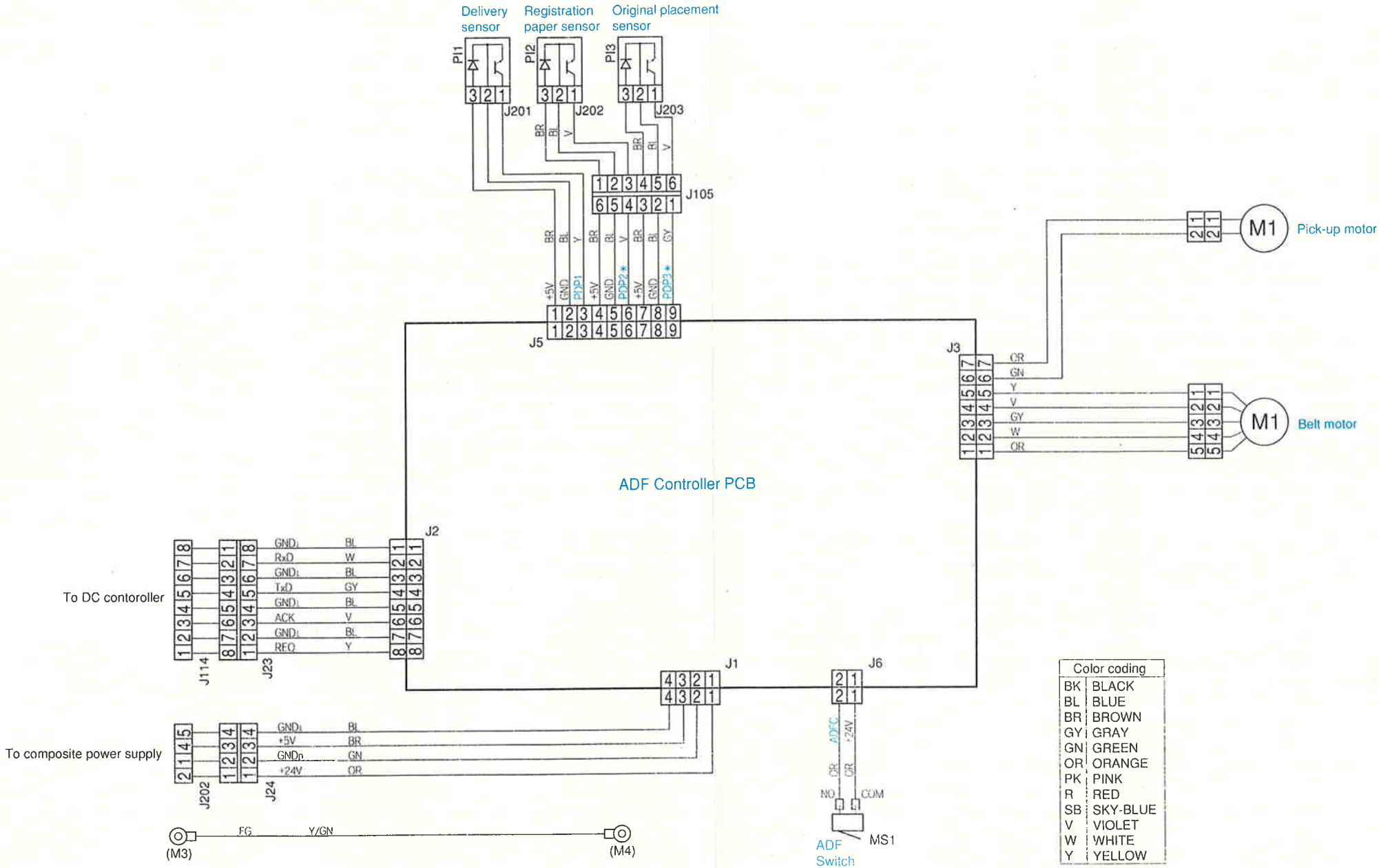

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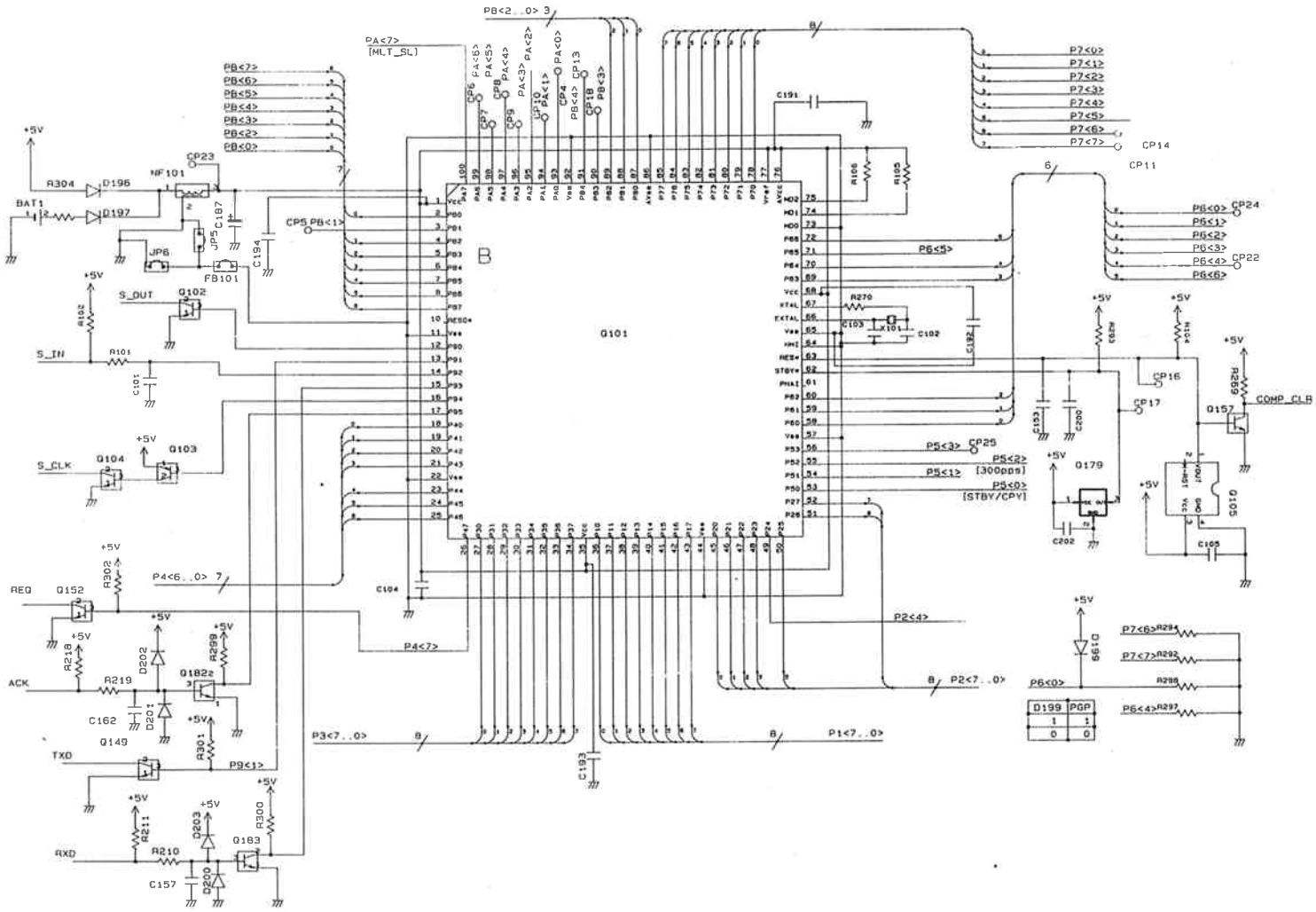
D. DC CONTROLLER CIRCUIT DIAGRAM

DC controller Circuit Diagram (1/8)



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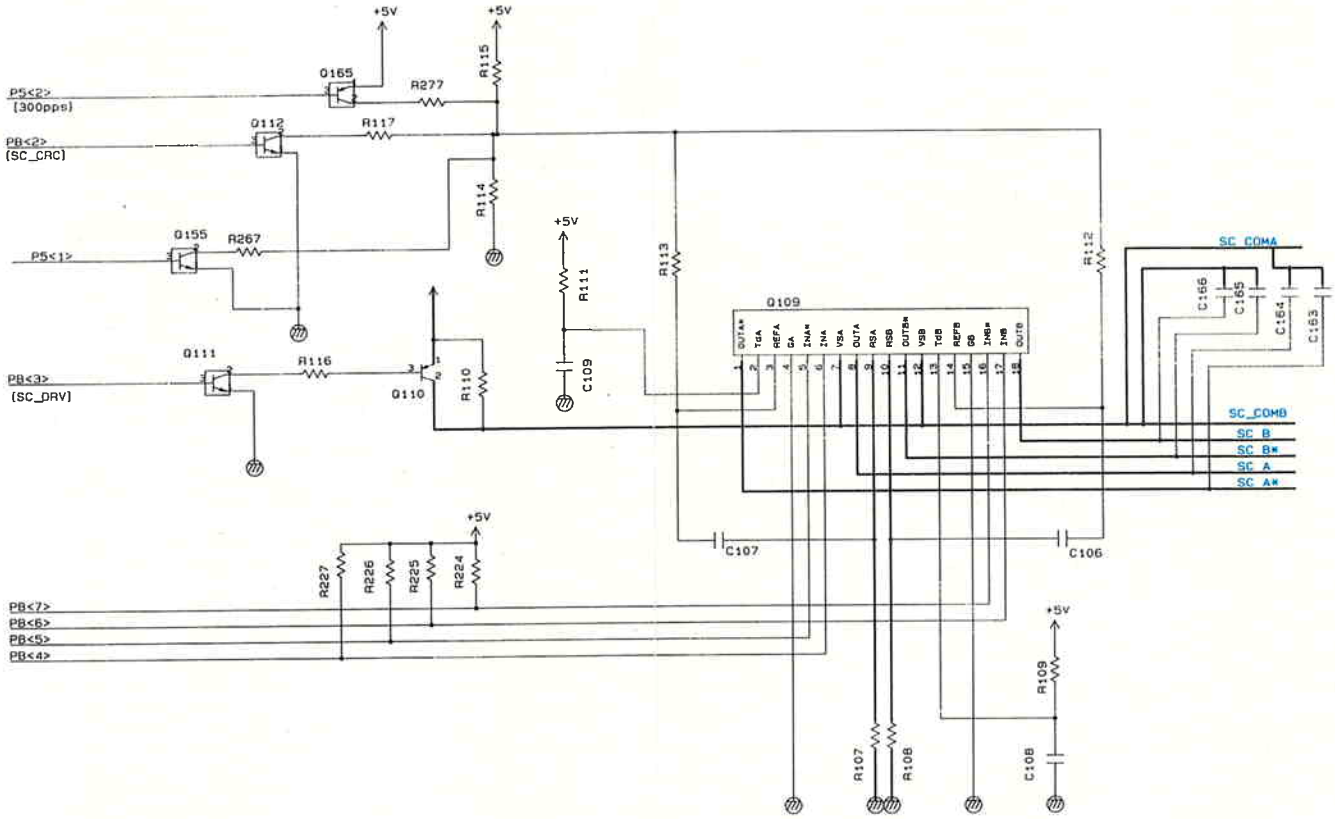
DC controller Circuit Diagram (2/8)



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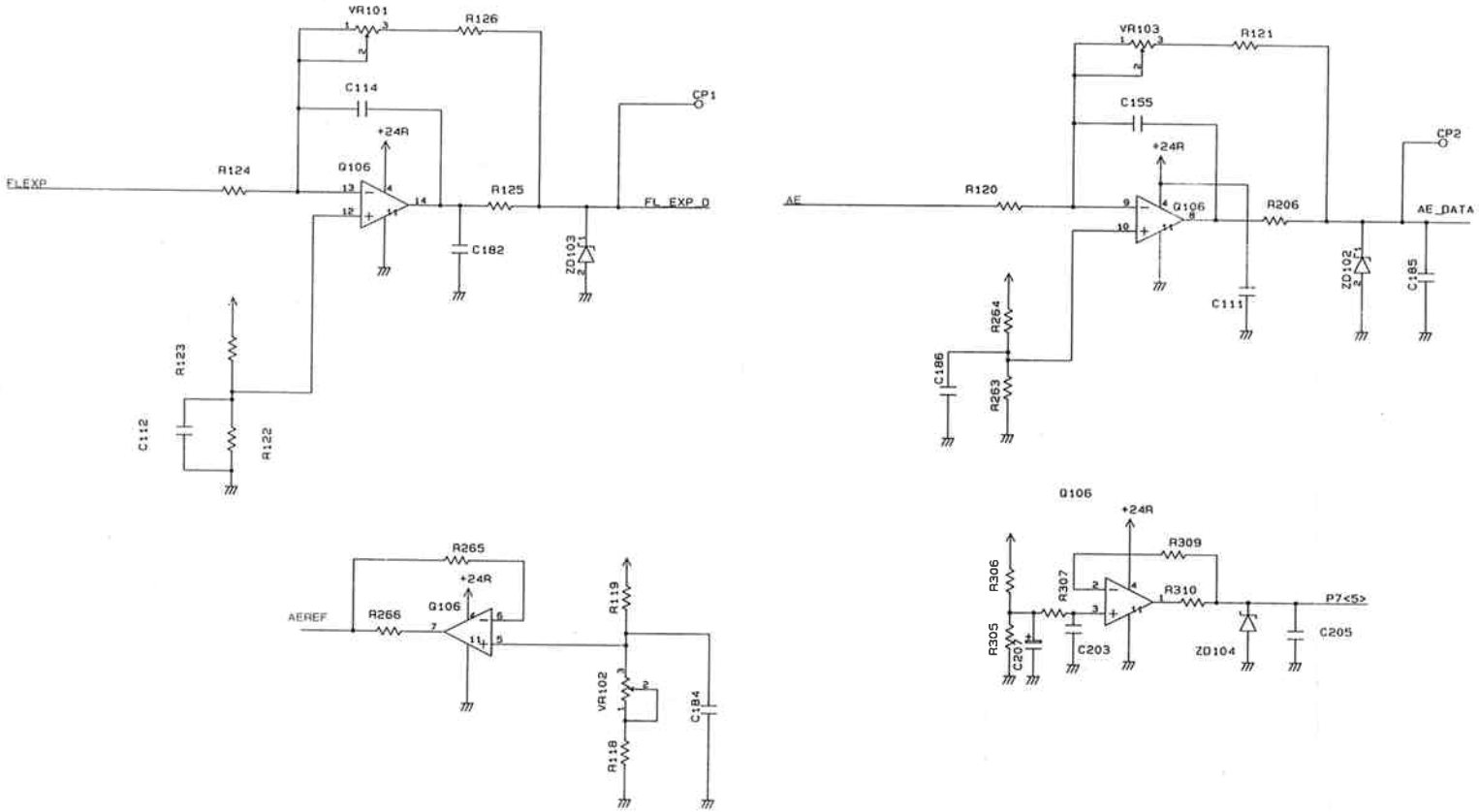

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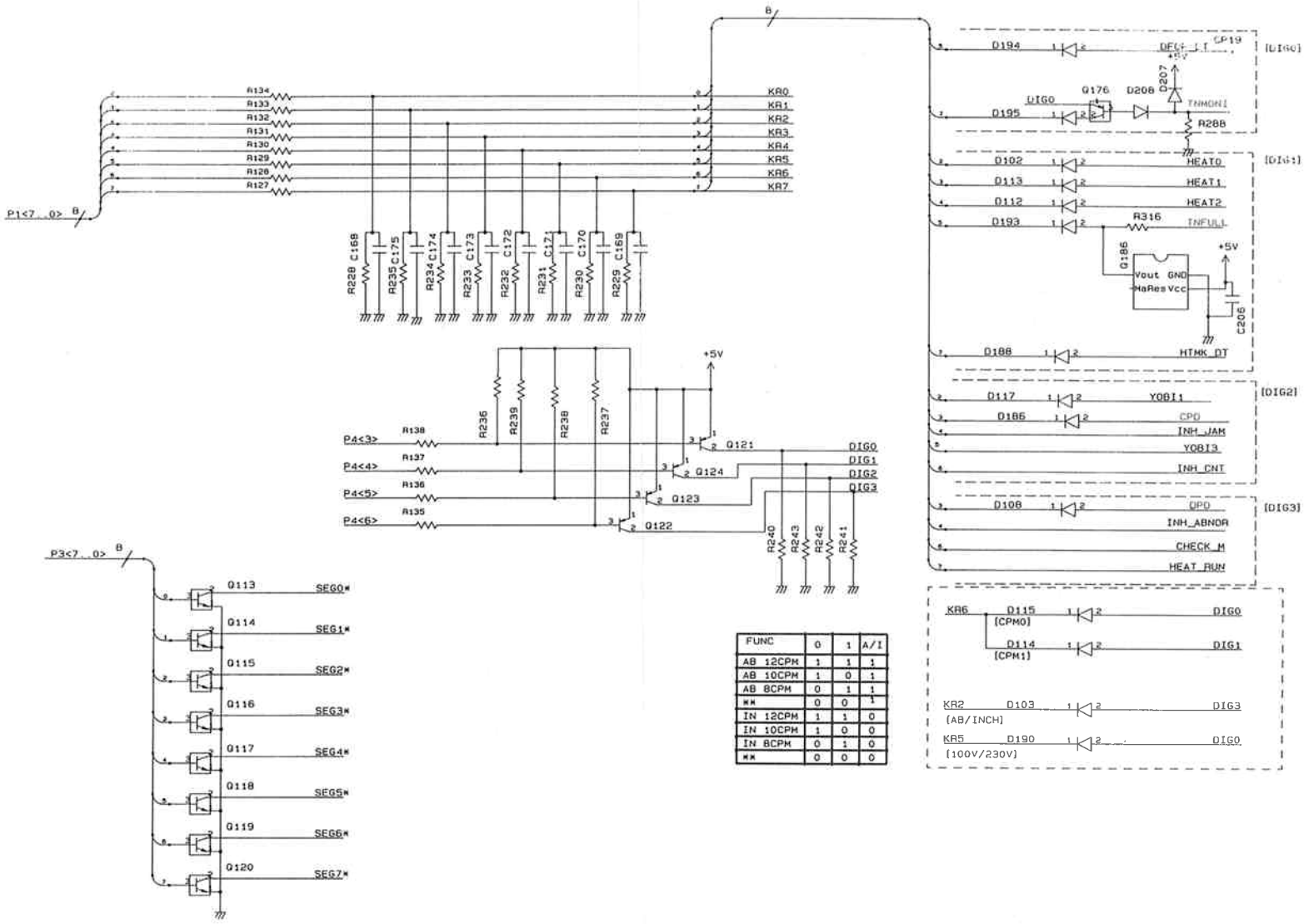

FUNC	0	1	A/I
AB 12CPM	1	1	1
AB 10CPM	1	0	1
AB 8CPM	0	1	1
**	0	0	1
IN 12CPM	1	1	0
IN 10CPM	1	0	0
IN 8CPM	0	1	0
**	0	0	0

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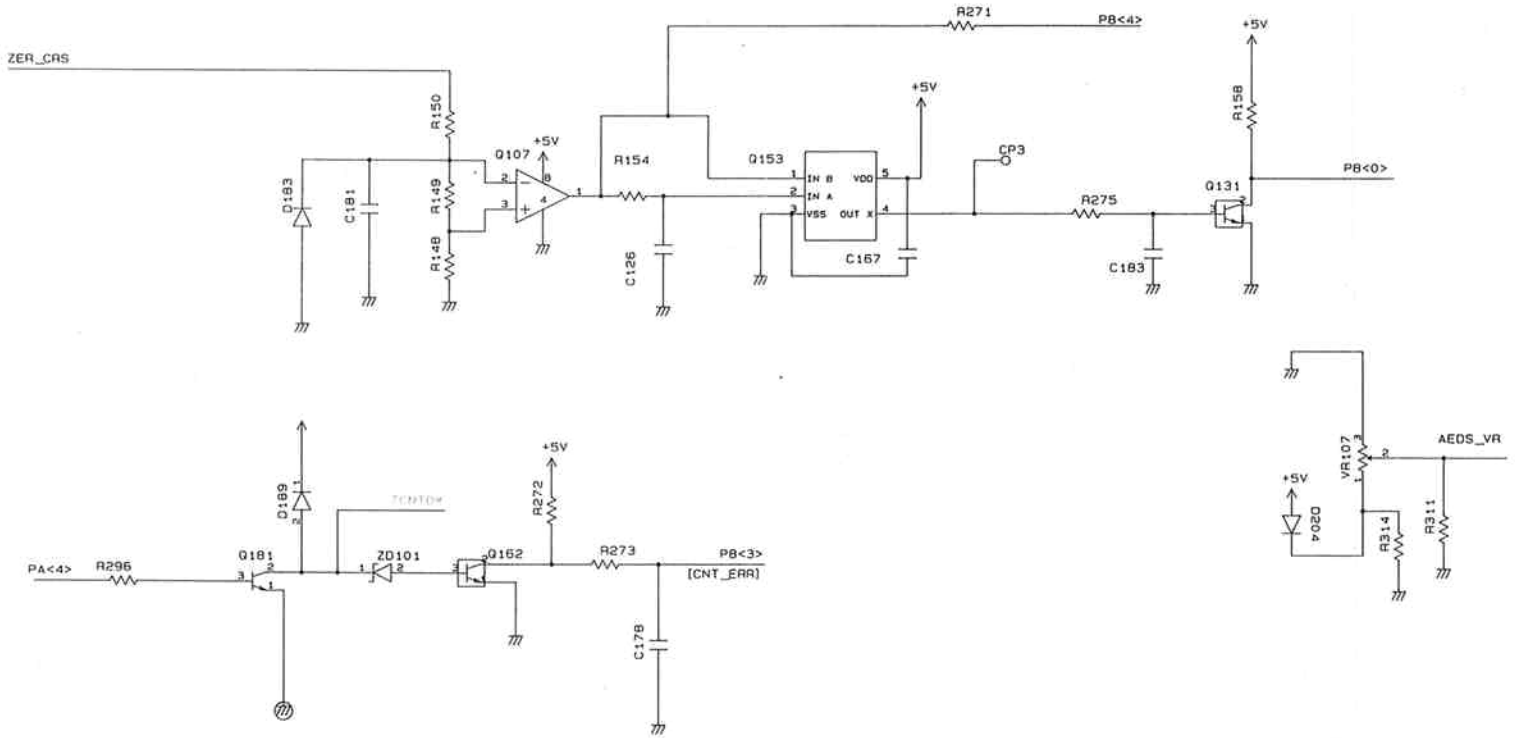

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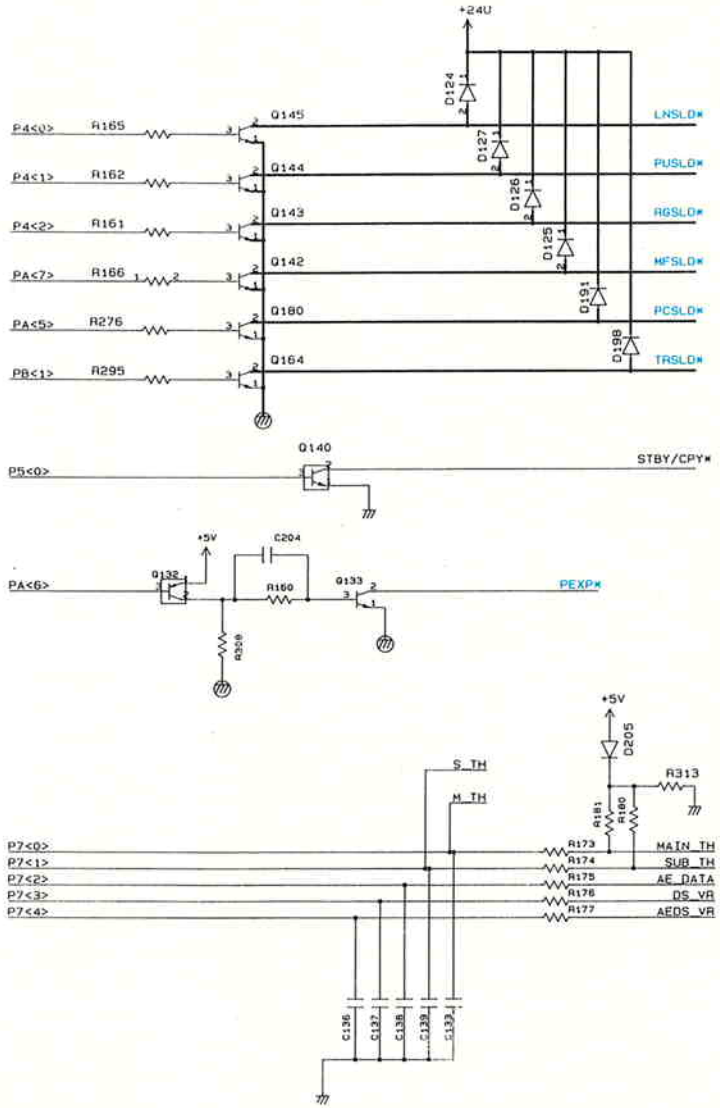
DC controller Circuit Diagram (6/8)



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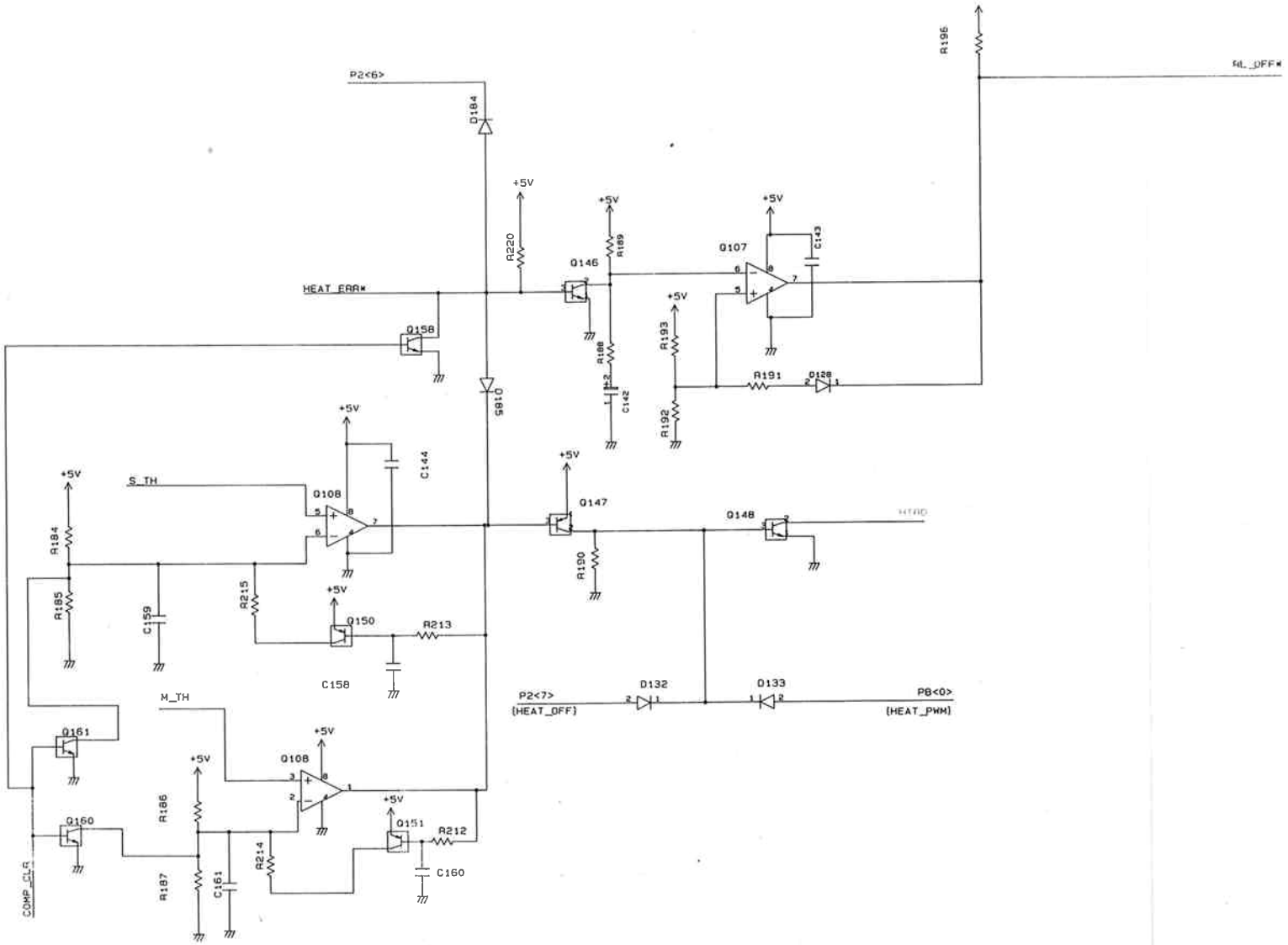

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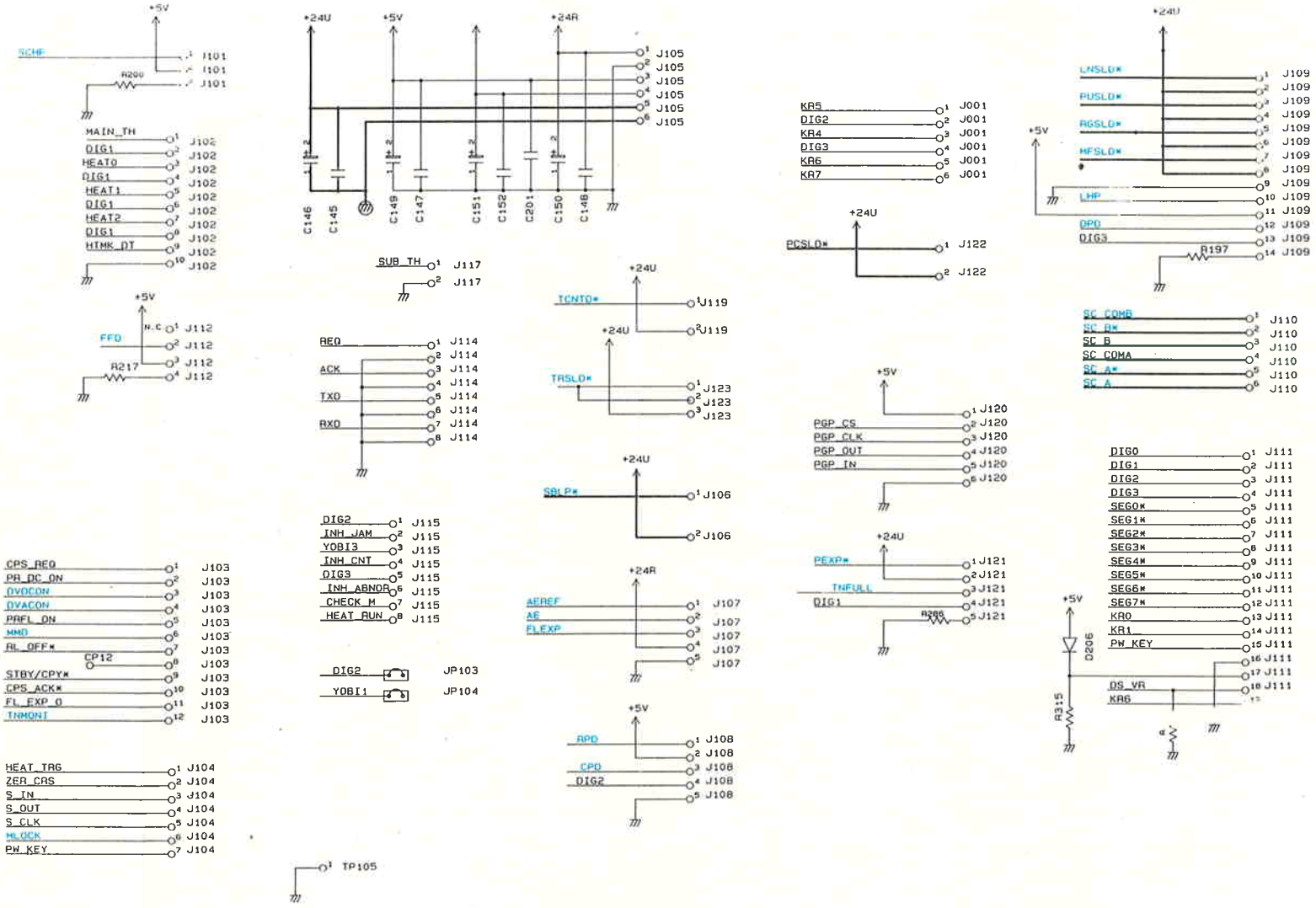
DC controller Circuit Diagram (8/8)



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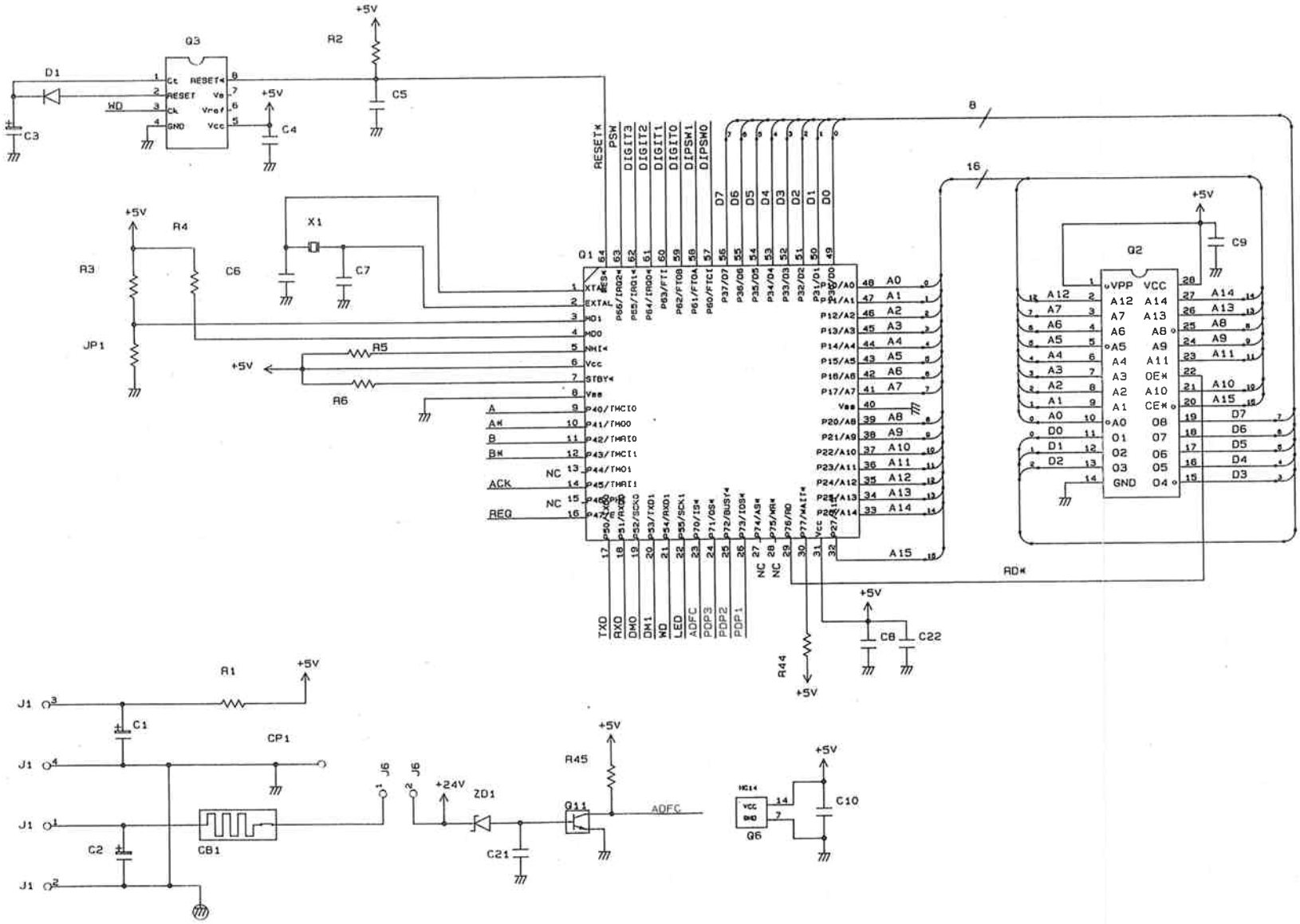
E. ADF CONTROLLER CIRCUIT DIAGRAM

ADF Controller Circuit Diagram (1/3)



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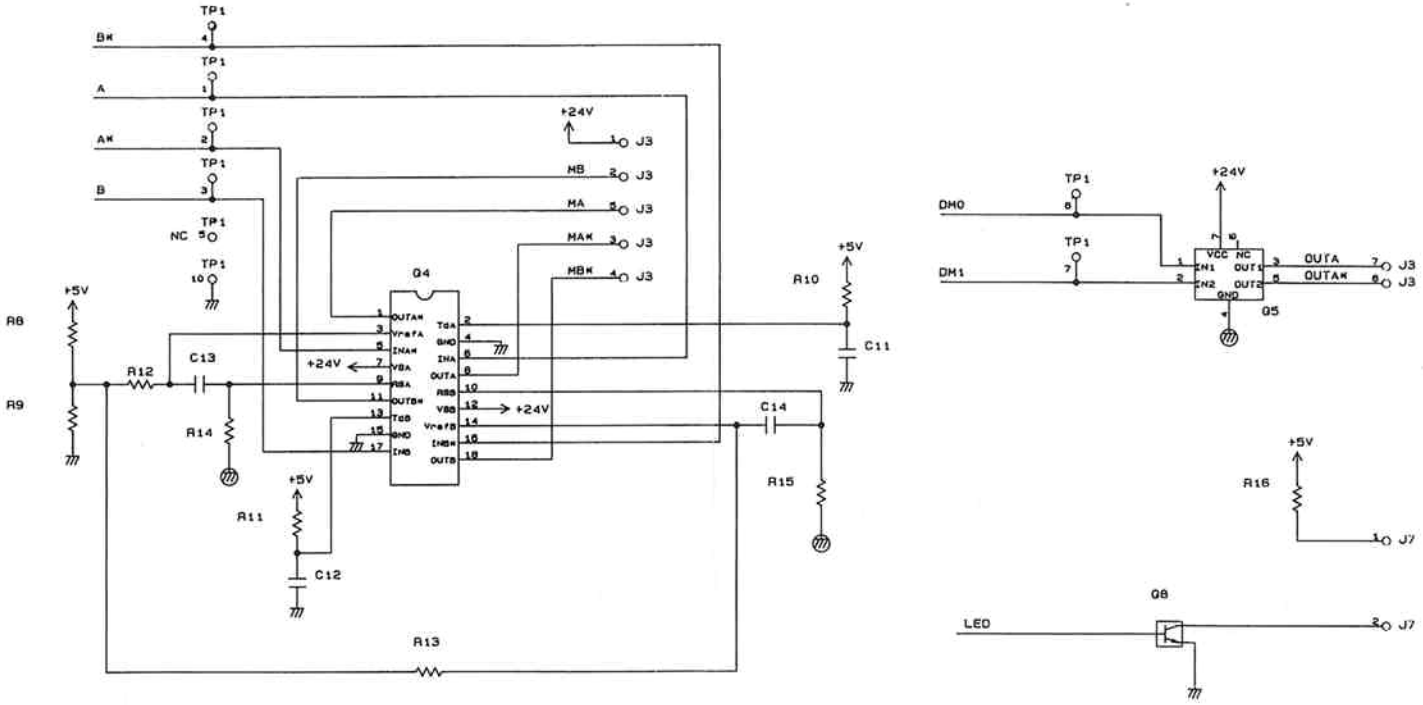

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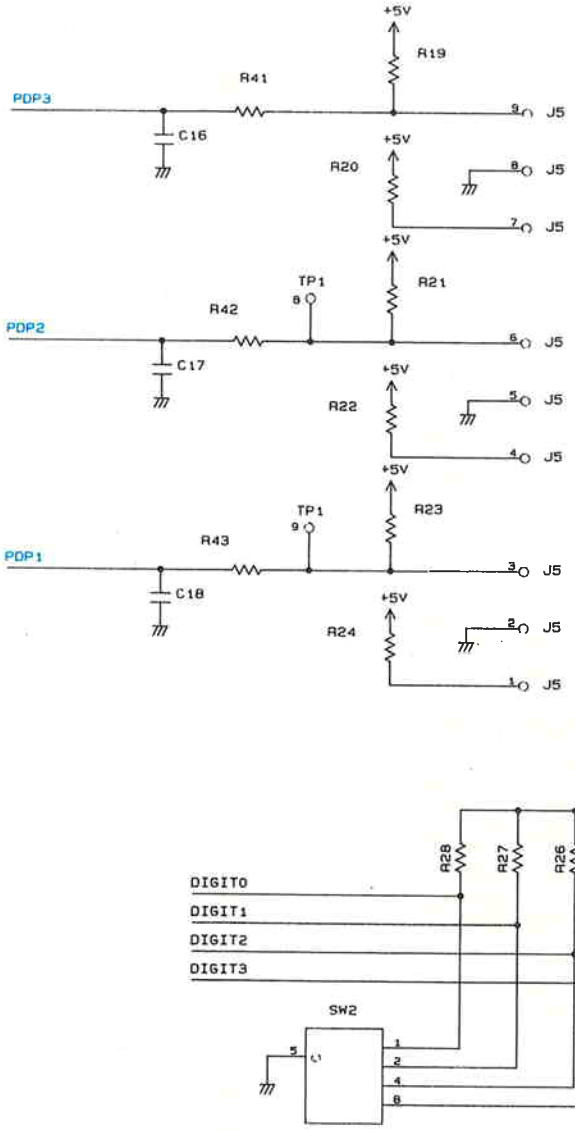

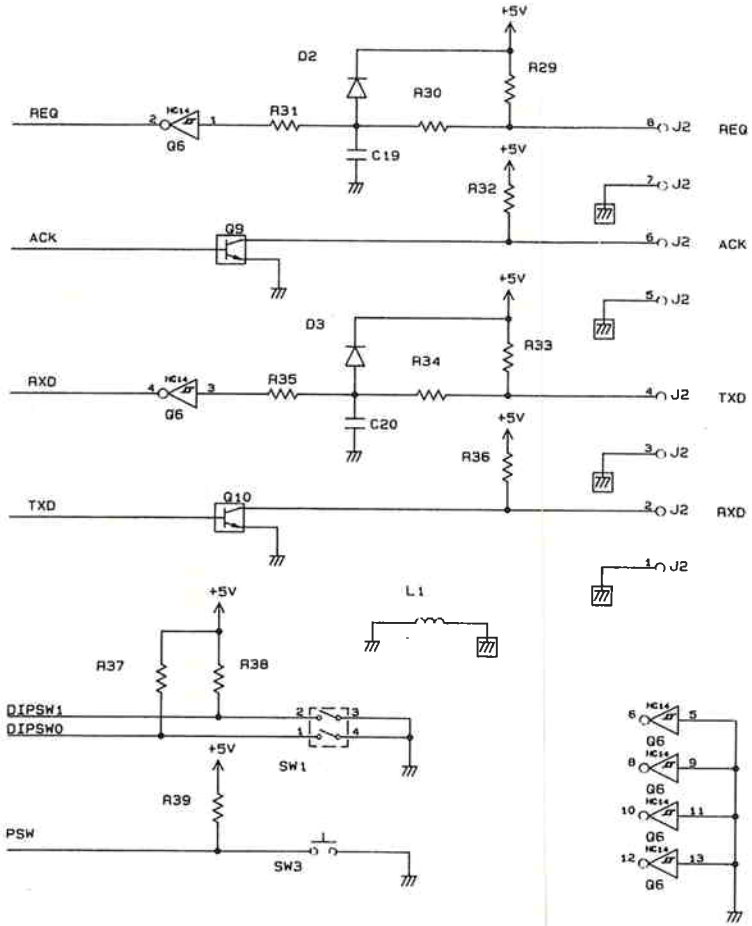

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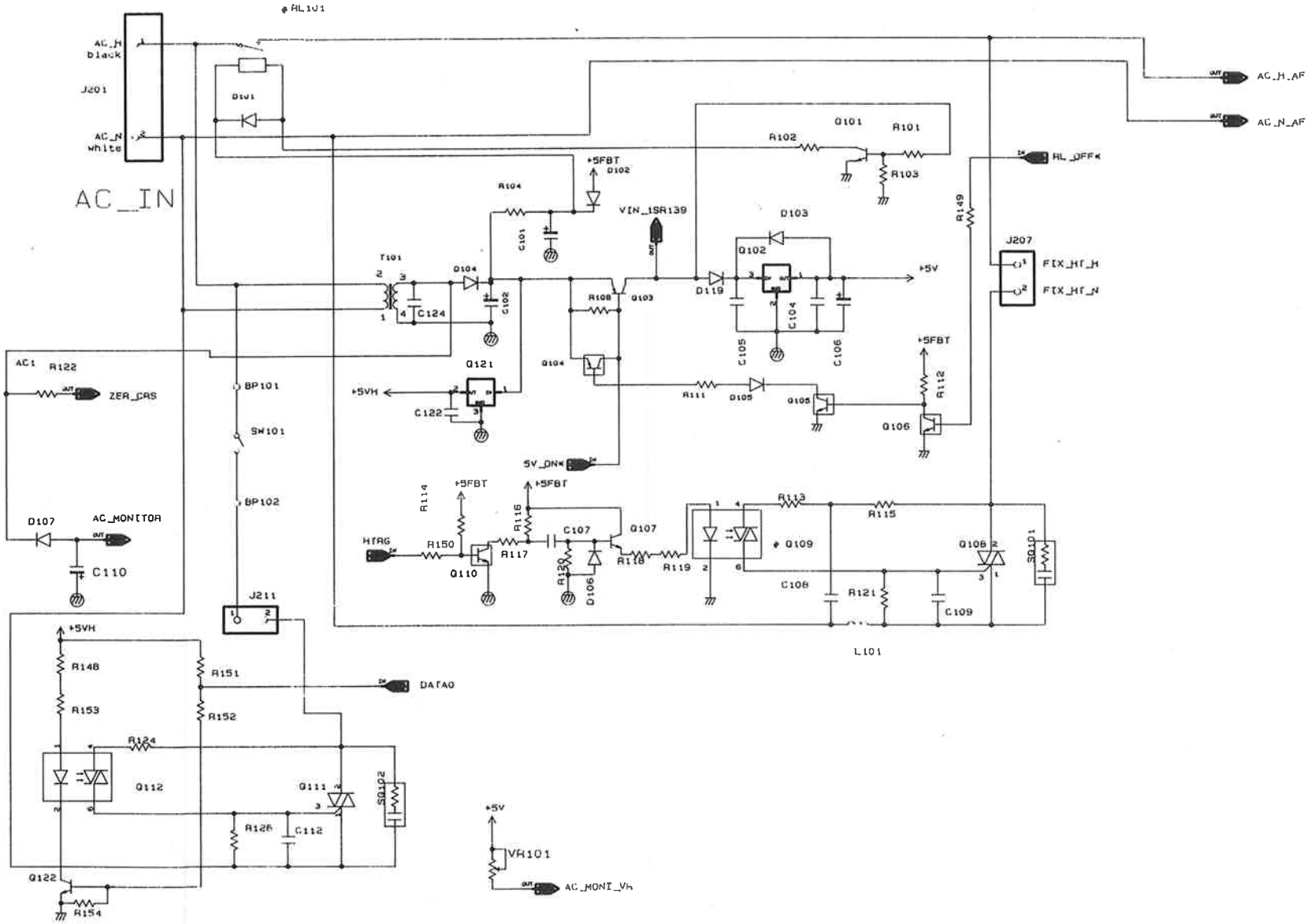
F. COMPOSITE POWER SUPPLY CIRCUIT DIAGRAM

Composite Power Supply Circuit Diagram (1/6)



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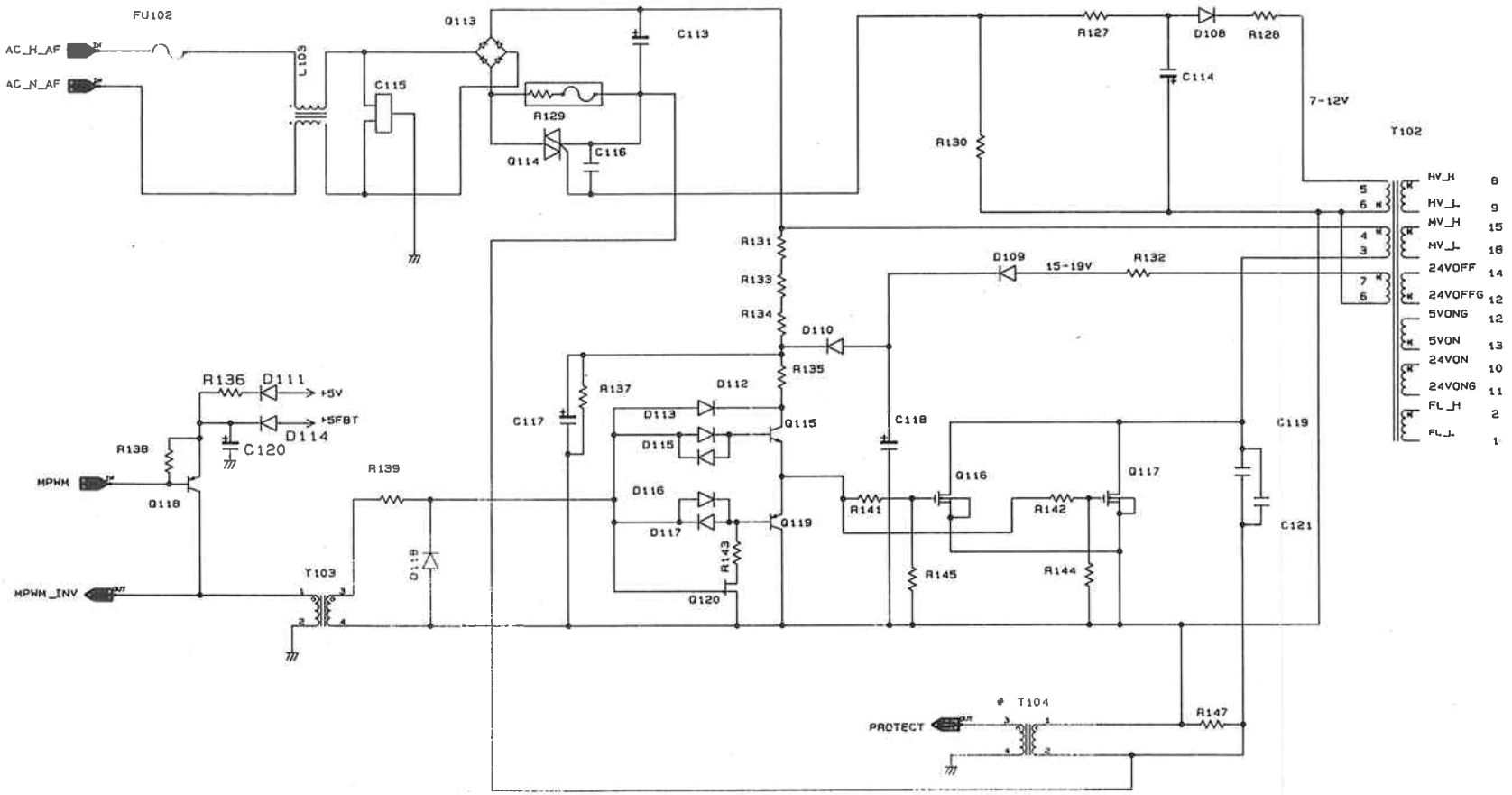

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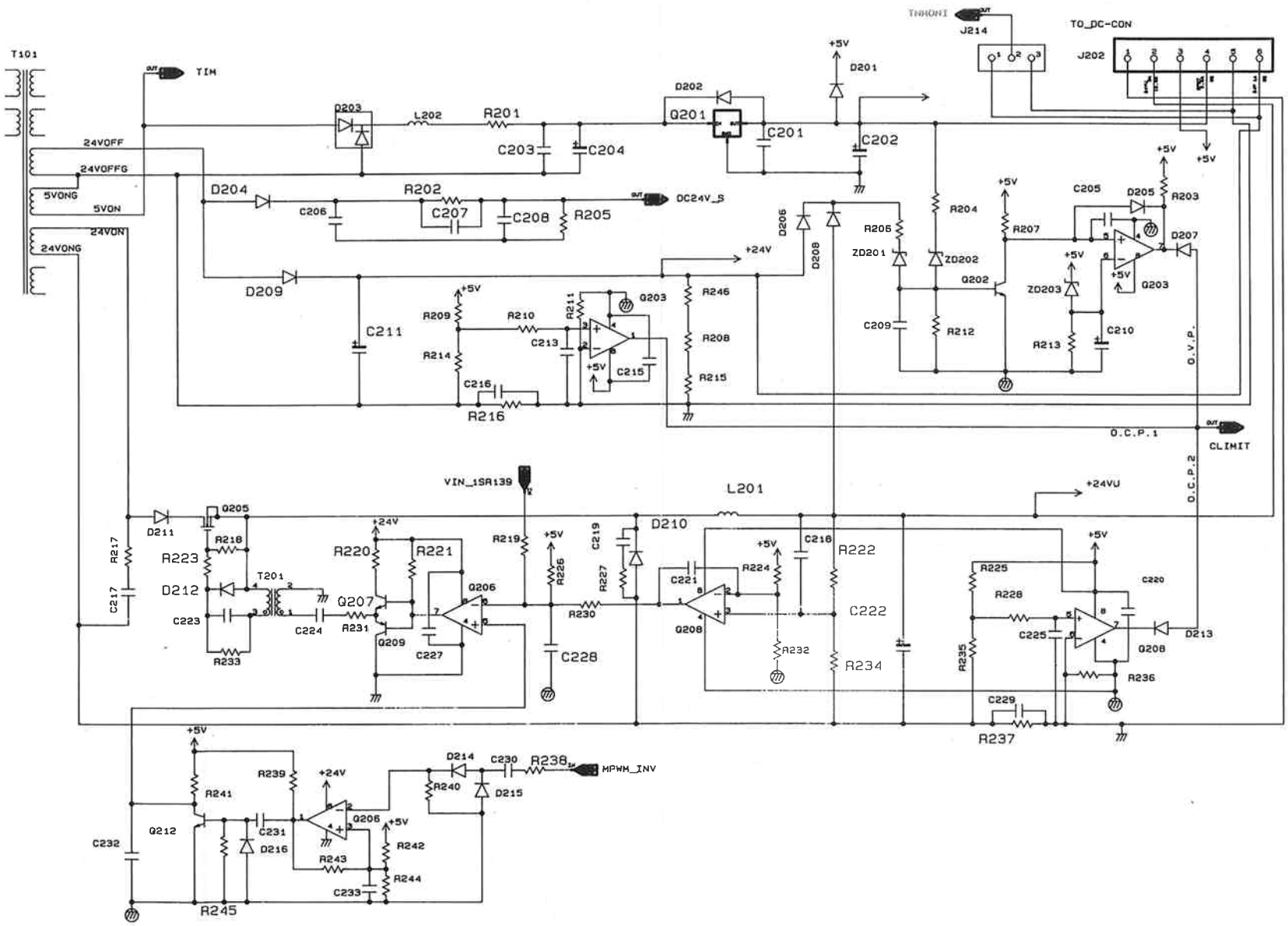
Composite Power Supply Circuit Diagram (3/6)



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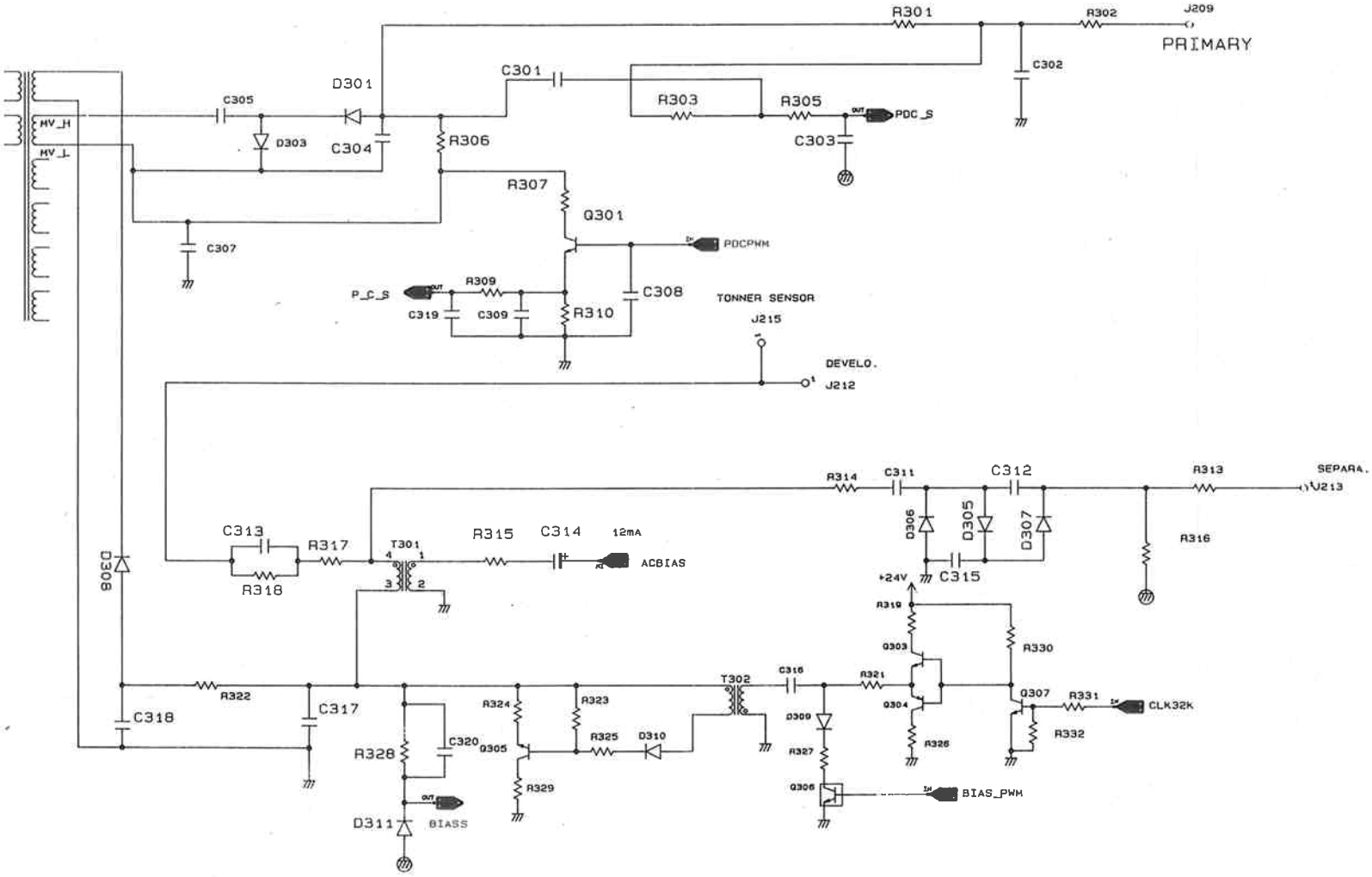

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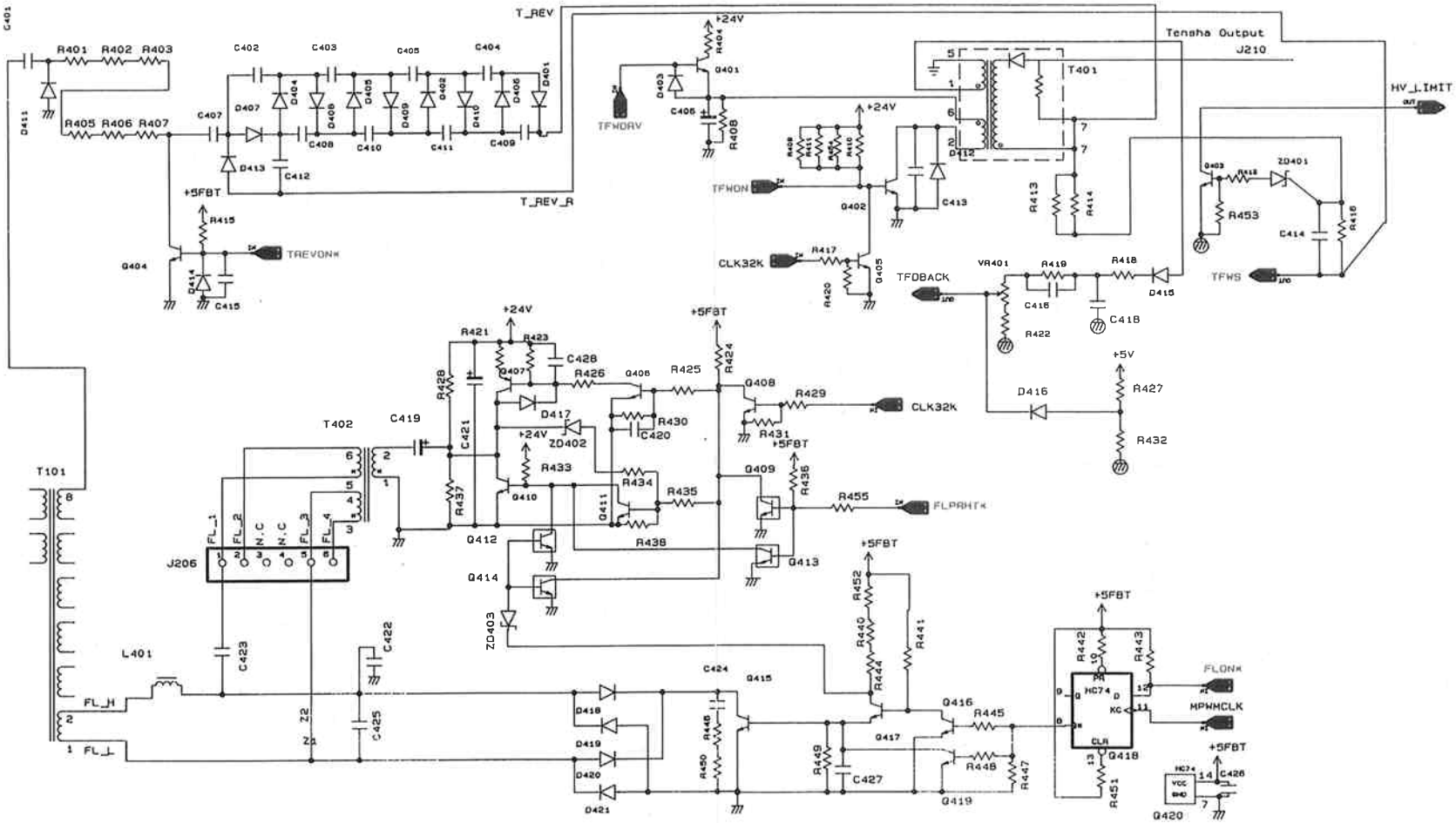
Composite Power Supply Circuit Diagram (5/6)



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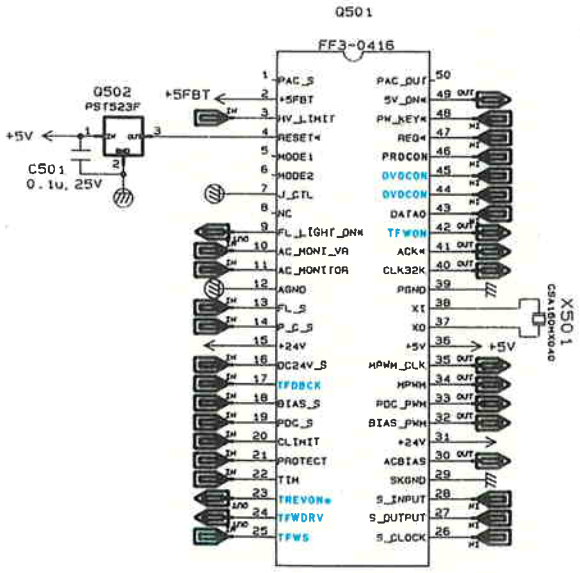

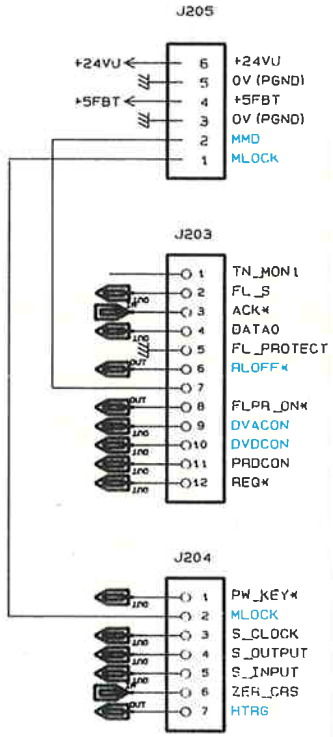

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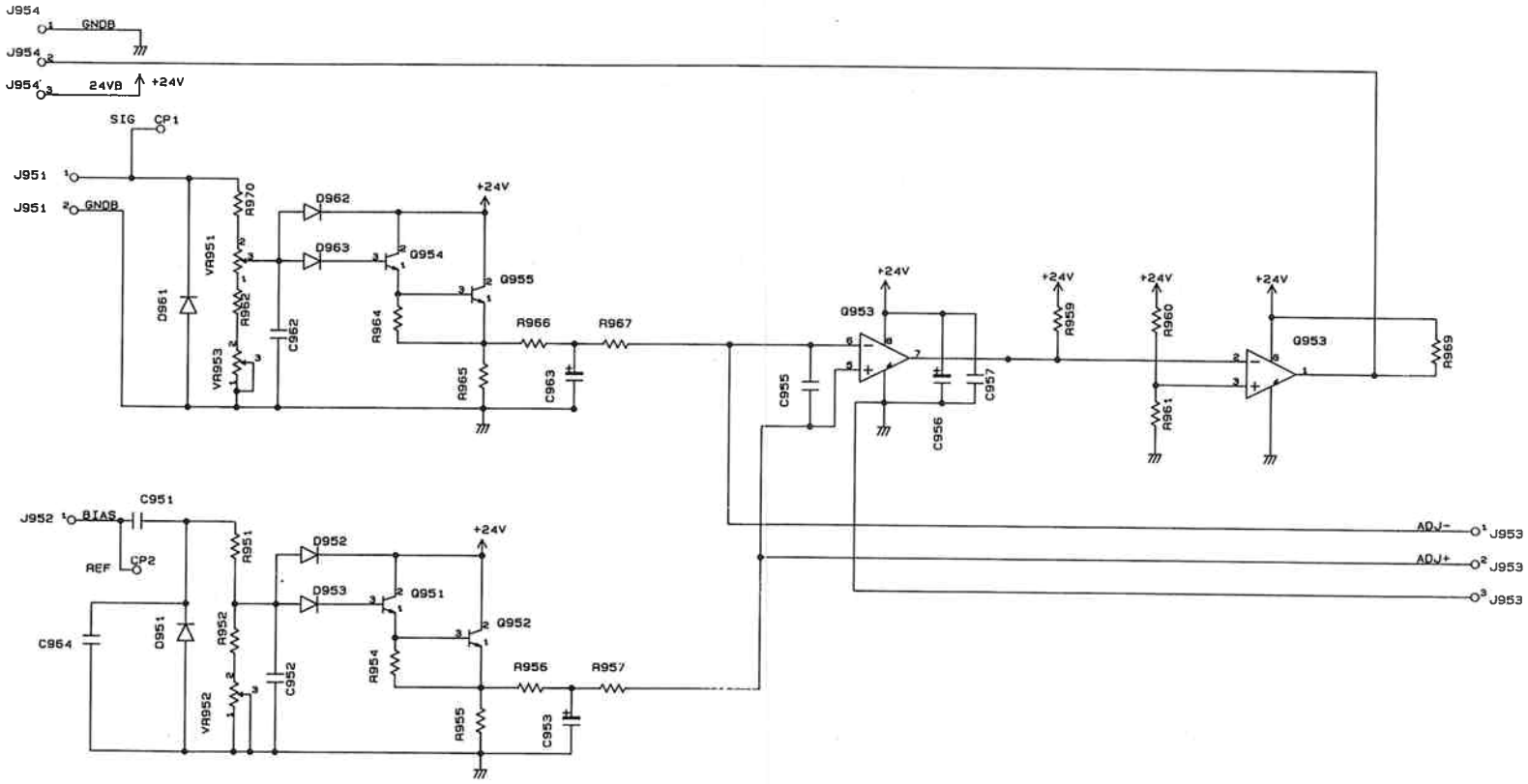
G. TONER LEVEL DETECTION CIRCUIT DIAGRAM



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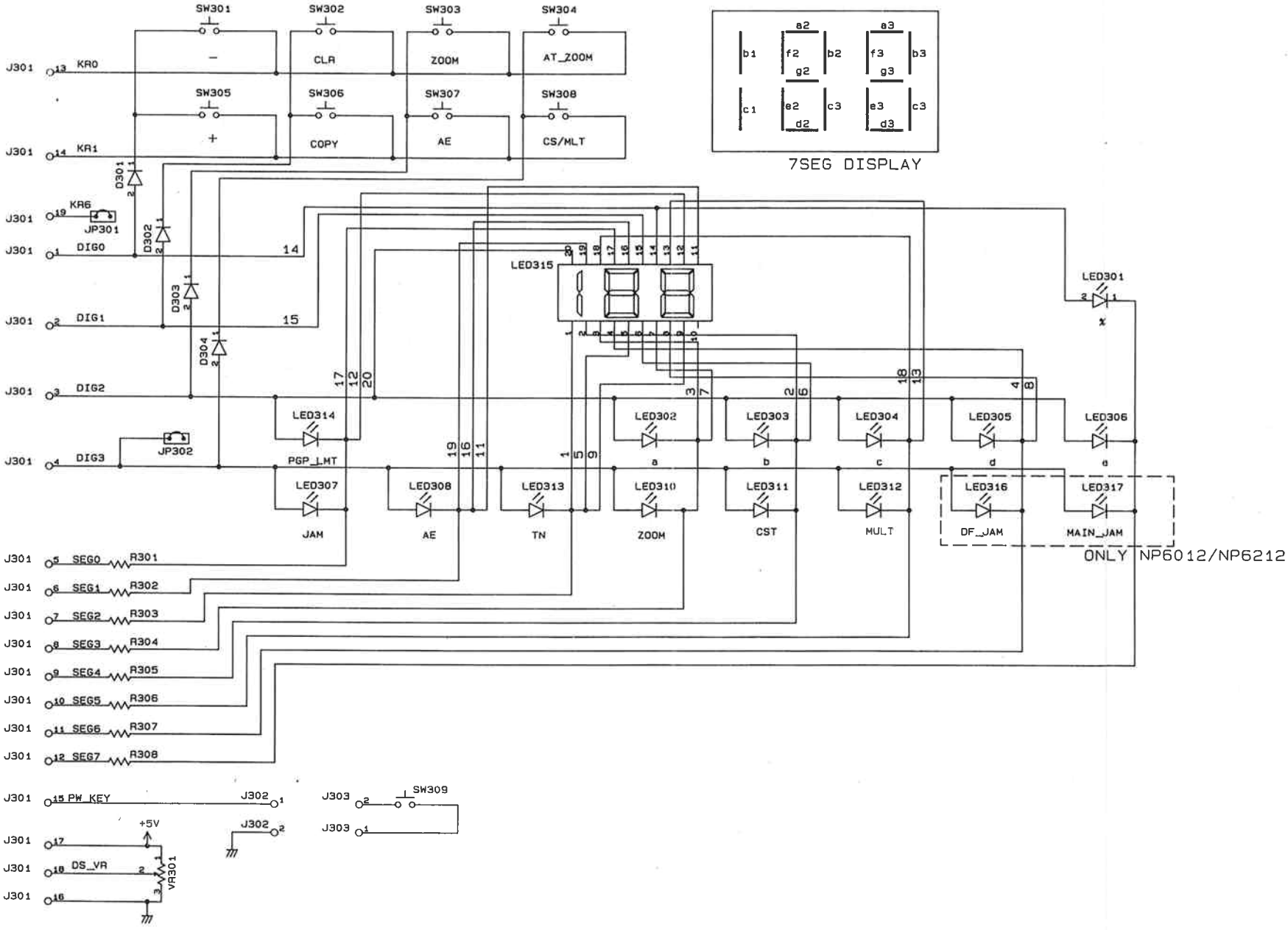
H. CONTROL PANEL CIRCUIT DIAGRAM



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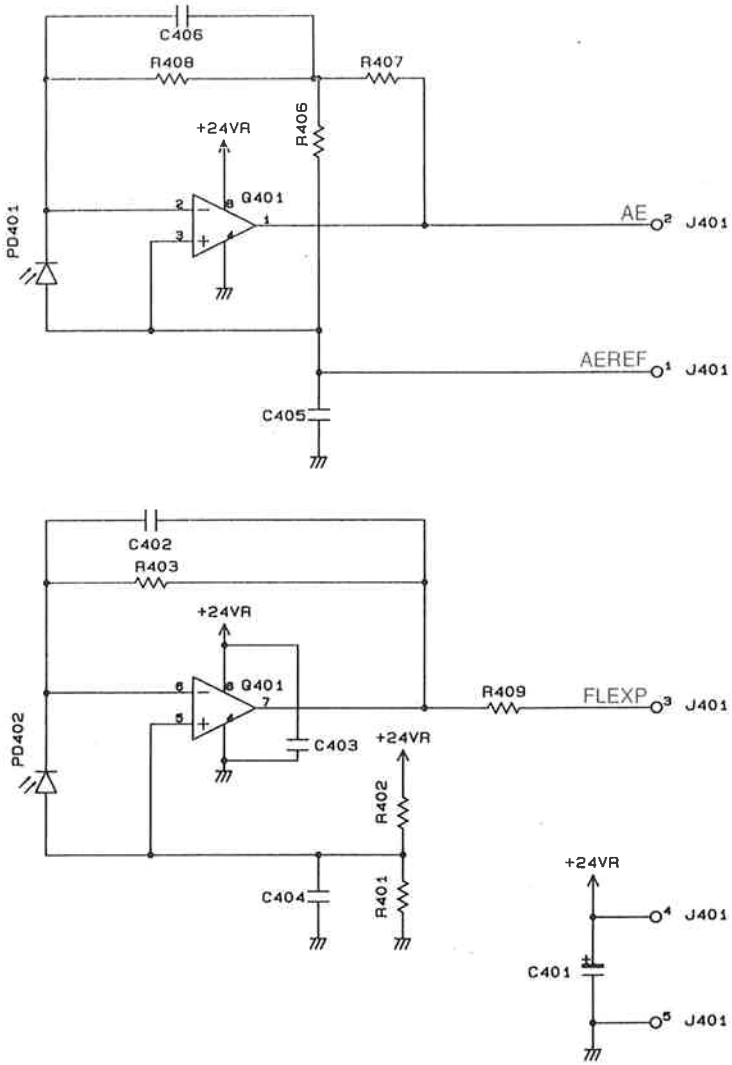
I. INTENSITY/AE SENSOR CIRCUIT DIARGAM



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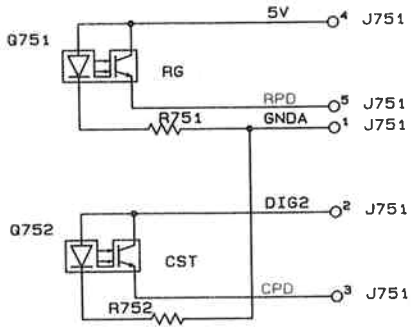
J. SENSOR CIRCUIT DIAGRAM



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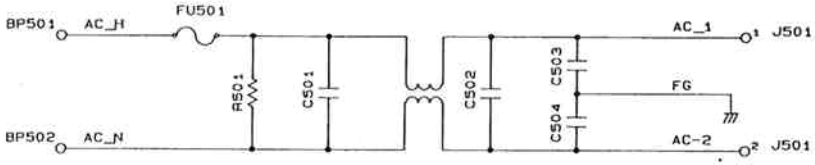
K. NOISE FILTER CIRCUIT DIAGRAM



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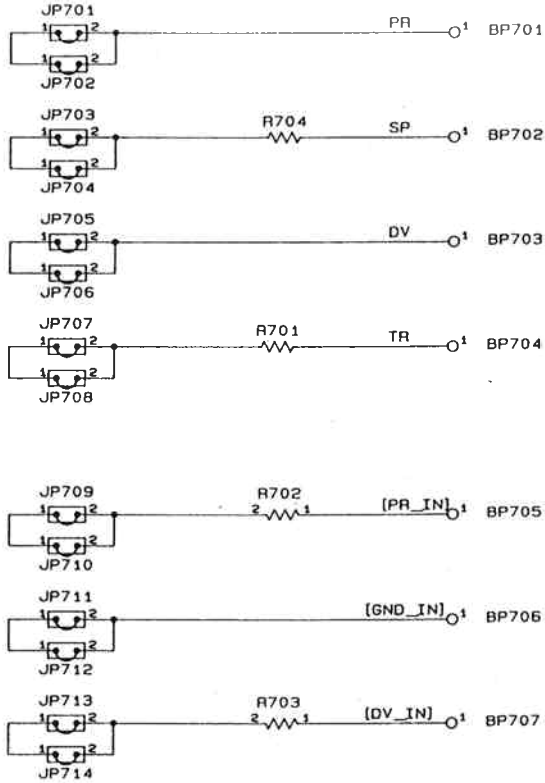
L. HIGH VOLTAGE CONTACT CIRCUIT DIAGRAM



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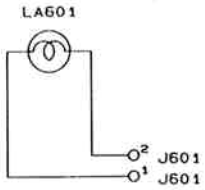
M. BLANK EXPOSURE (front) CIRCUIT DIAGRAM



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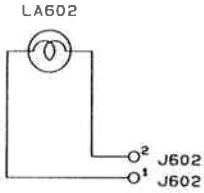
N. BLANK EXPOSURE (rear) CIRCUIT DIAGRAM



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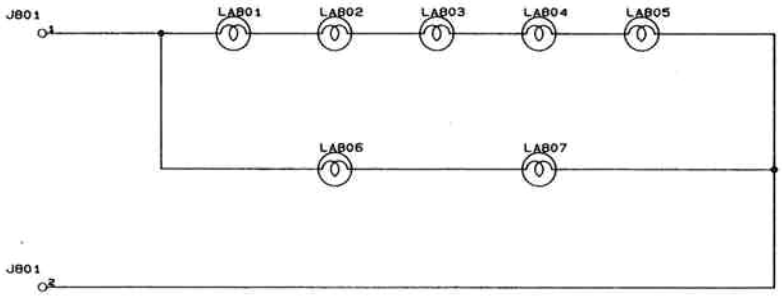
O. PRE-EXPOSURE CIRCUIT DIAGRAM



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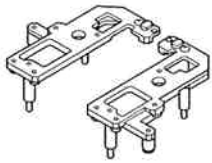
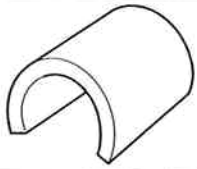
P. SPECIAL TOOLS

You will need the following special tool(s) in addition to the standard tools set when servicing the machine.

No.	Tool	Tool No.	Shape	Rank*	Remarks
1	Mirror positioning tool (pair for front and rear)	FY9-3009-020		B	For adjusting the distance between the No. 1 and No. 2 mirrors.
2	Wire clip	FY9-3017-000		B	For fixing the scanner wire in place while adjusting its tension.

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Q. SOLVENTS/OILS

No.	Name	Uses	Composition	Remarks
1	Alcohol	Cleaning: e.g., glass, plastic, rubber parts; external covers	Hydrocarbon (fluorine family) Alcohol Surface active agent	• Do not bring near fire. • Procure locally. • Isopropyl alcohol may be substituted.
2	Solvent	Cleaning: e.g., metal; oil or toner dirt	Hydrocarbon (fluorine/chlorine family) Alcohol	• Do not bring near fire. • Procure locally.
3	Lubricating oil	Lubricating spring clutch	Mineral oil (paraffin family)	• CK-0451 (100cc)
4	Lubricating oil	Lubricating drive and friction parts, scanner rail	Silicone oil	• CK-0551 (20g)

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